

COUNTY OF ORANGE
PUBLIC FACILITIES AND RESOURCES DEPARTMENT

HYDROLOGIC DATA REPORT
1998-1999 SEASON
VOLUME XXXV

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HYDROLOGIC DATA REPORT 1998-1999 SEASON

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EXECUTIVE SUMMARY

The 1998-1999 Hydrologic Data Report was prepared to provide a collation of hydrologic information that can be used in water related studies including water quality, sediment transport and watershed runoff modeling. The data is also used in updating the Orange County Hydrology Manual, preparing National Pollution Discharge Elimination System (NPDES) Stormwater compliance reports, litigation and in designing flood control facilities and water conservation structures.

A summary of the July 1, 1998 - June 30, 1999 season with respect to precipitation, streamflow and reservoir/dam operations is presented below.

Precipitation

The 1998-1999 was a below average rainfall year with the season precipitation values ranging between 46 to 73 % of the long term averages. Annual precipitation totals for selected stations in Orange County varied from 6.65 inches at Costa Mesa to 26.30 inches at Santiago peak

The Santa Ana precipitation station (Station 121) recorded an annual rainfall total of 7.55 inches which is 5.63 inches less than the long term average and represents the lowest total since water year 1988-1989.

Streamflow

The maximum peak discharge for all runoff stations was 3,210 cfs, which was recorded at the San Diego Creek-Campus Drive station. Two streamgaging stations, Bolsa Chica Channel and San Diego Creek at Campus, recorded the lowest annual discharge volume (in acre feet) on record.

Discharge records are not included for Lower Oso Creek, Oceanview Channel and Alameda Storm Drain. The stage-discharge relationship for lower Oso is presently being defined and Oceanview Channel and Alameda were undergoing channel improvements and gage house replacement.

Evaporation, Reservoirs and Dams

The maximum monthly evaporation for Villa Park Dam was recorded in July 1998 at 7.39 inches. The total evaporation for the season was 56.93 inches which is approximately 0.80 inches above the long term average.

Villa Park Dam recorded a peak inflow and outflow on January 26 of 15 cfs and November 3 of 25.8 cfs, respectively. The total dam inflow and outflow for the season was 709 and 5,869 acre feet, respectively. The maximum storage of 5,194 acre feet was recorded on July 1.

The total season evaporation for Sulphur Creek Dam was 58.33 inches which was approximately 1.30 inches greater than the long term average. The maximum monthly total of 7.61 inches was recorded in July 1998 whereas the lowest monthly total of 2.58 inches was recorded in January.

Sulphur Creek Dam recorded a peak outflow on April 12 of 65 cfs. The total inflow and outflow volumes for Sulphur Creek Dam were 699 and 702 acre feet, respectively.

SECTION 1.0

INTRODUCTION

1.0 INTRODUCTION

The 1998-1999 Hydrologic Data Report contains hydrologic data from Orange County collected during the 12-month period, July 1, 1998 through June 30, 1999. The purpose of the report is to collate hydrologic information that can be used in water related studies including water quality, sediment transport and watershed runoff modeling. The data is also used in updating the Orange County Hydrology Manual, preparing NPDES stormwater compliance reports, litigation and in designing flood control facilities and water conservation structures.

The Hydrologic Data Report is separated into three sections which are briefly discussed below:

1. Precipitation - Describes the precipitation network and summarizes rainfall data for specific stations within Orange County. Included is an overview of the ALERT flood detection system.
2. Streamflow - Provides information regarding the streamgaging network and includes monthly and seasonal discharge data for selected stations. Also provided is information on the USGS streamgaging stations in Orange County.
3. Evaporation, Reservoirs and Dams - Provides data for several historical and current evaporation stations. Also provided is a summary of the flood control and water conservation dams with specific data for Villa Park, Sulphur Creek and Prado Dams.

SECTION 2.0

PRECIPITATION

2.0 PRECIPITATION

2.1 Overview

The Public Facilities and Resources Department (PFRD) maintains records for 167 recording/non-recording precipitation stations in and adjacent to Orange County. Station locations are shown in Figures 1 and 2. Of these, 46 are active precipitation stations; 14 of which are operated and maintained by PFRD. The remaining stations are operated and maintained through the Department's cooperative observer program. Station names, type of raingage, period of record and observer are listed in Tables 1 and 2. The longest period of record for an active precipitation station is Tustin-Irvine Ranch (Station #61) which dates back to the late 1800's.

In addition to the recording/non-recording rainfall stations, PFRD operates and maintains the ALERT (Automated Local Evaluation in Real Time) flood detection system. The ALERT precipitation network consists of 67 rain and snow gages located throughout Orange County and surrounding areas described in Table 3. A map which shows the location of the ALERT rainfall stations is shown in Figure 3.

The ALERT system is an automated, real-time radio reporting flood detection system. Each ALERT precipitation gage is a modular, self contained, event recording unit which transmits rainfall in real time to the base station computer located at the Katella Facility. During storm events, a tipping bucket mechanism records each 0.04 inches of rainfall which causes the electronics and radio package to transmit a station identification and precipitation value to the base station computer. The precipitation value is stored as an accumulated total. At stations equipped with both standard and ALERT raingages, the readings from the standard gages are used to verify the records produced by ALERT.

Components of the ALERT system are presented in Figure 4.

2.2 1998-1999 Data Presentation

Precipitation summaries for 18 selected stations and a map showing respective station locations are shown in Table 4 and Figure 5. Stations were selected to give a representative picture of the rainfall occurring throughout Orange County during the 1998-1999. Tables 5-22 provide a summary of daily and monthly total rainfalls.

Total season precipitation values for the stations ranged from 46% to 73% of the long term averages.

Short and long duration rainfall intensities and their return frequencies for 30 precipitation stations are listed in Tables 23 and 24. Station locations are presented in Figure 6.

A graph which shows the flood years and annual rainfall totals recorded at the Santa Ana Station (Station 121) for the period 1909-1999 is presented in Figure 7.

Equal lines of precipitation for the 1998-99 season and 25-year mean are presented in the isohyet maps shown in Figures 8 and 9.

Table 1
HISTORICAL PRECIPITATION STATIONS

Sta. No.	Station Name	Equip Type	North Latitude	West Longitude	Elev Feet	Record Begins	Record Ends	Cooperator
1	Seal Beach	S	33-44-38	118-06-43	12	1928	1968	City of Seal Beach
2	Los Alamitos Sugar Factory	S	33-48-30	118-04-00	20	1910	1932	Private Observer
3	Artesia Fire Station	S	33-51-48	118-04-58	52	1917	1985	LACDPW
6	La Habra Citrus Association	NR	33-55-42	117-56-42	300	1925	1956	Private Observer
19	Tres Hermanos Ranch	NR	33-59-30	117-48-05	975	1930	1963	Private Observer
20	Carbon Canyon Summit	NR	33-57-58	117-45-40	1200	1930	1961	Private Observer
22	La Vida Springs	NR	33-55-48	117-47-42	858	1930	1962	Private Observer
23	Prado Dam	S	33-53-24	117-38-09	575	1931	1969	PFRD
25	Yorba Ranch	NR	33-52-00	117-46-00	380	1927	1944	Private Observer
26	Yorba Linda	S	33-53-16	117-49-10	395	1912	1982	Private Observer
27	Placentia Mutual Orange Assoc.	NR	33-52-04	117-52-24	225	1912	1982	Private Observer
28	Fullerton Knowlton	S	33-52-20	117-53-45	180	1919	1988	Private Observer
29	Anaheim Union Water works	S	33-51-32	117-53-06	190	1930	1969	Private Observer
30	Olive - First National Bank	NR	33-49-53	117-54-43	230	1921	1934	Private Observer
31	Anaheim - Dickel	NR	33-50-08	117-54-54	160	1879	1921	Private Observer
33	Anaheim City Hall	S	33-50-05	117-54-42	160	1880	1992	City of Anaheim
35	Anaheim Associated Laboratory	NR	33-50-00	117-56-12	130	1927	1947	Private Observer
36	Anaheim Substation	S	33-48-11	117-54-05	143	1923	1989	City of Anaheim
37	Garden Grove - Allen Ranch	NR	33-47-06	117-56-27	100	1924	1959	Private Observer
38	Garden Grove Lumber Co.	NR	33-46-24	117-56-30	95	1914	1943	Private Observer
39	Stanton - Clark	NR	33-48-30	118-00-06	60	1926	1964	Private Observer
42	Talbert	NR	33-42-06	117-56-42	40	1918	1931	Private Observer
43	Wintersburg - Slater	NR	33-42-47	117-56-42	25	1928	1971	Private Observer
46	Costa Mesa Park	S	33-38-26	117-55-16	95	1928	1976	City of Costa Mesa
47	Costa Mesa - Shiffer	NR	33-40-56	117-53-47	47	1928	1968	Private Observer
48	Irvine - Coast Ranch	NR	33-36-10	117-53-00	50	1929	1946	The Irvine Co.
49	Irvine - Morro	NR	33-33-36	117-49-18	50	1900	1945	Private Observer
50	El Toro - Moulton Ranch	NR	33-36-26	117-42-08	375	1877	1972	Private Observer
51	Irvine - Shaddy Camp	NR	33-37-59	117-48-16	270	1903	1970	The Irvine Co.
52	Irvine - Bommer (Old Cattle)	NR	33-39-48	117-49-54	80	1898	1977	The Irvine Co.
53	Irvine - Hog Ranch	NR	33-39-50	117-52-36	60	1913	1924	The Irvine Co.
54	Irvine - Harkle Road	NR	33-41-00	117-48-00	100	1911	1970	The Irvine Co.
55	Irvine - Warehouse	NR	33-40-00	117-45-00	200	1894	1972	The Irvine Co.
56	Irvine - Baudino Ranch	S	33-38-56	117-42-35	355	1911	1975	The Irvine Co.
57	Irvine - Lambert Ranch	NR	33-42-00	117-43-00	430	1927	1973	The Irvine Co.
60	Irvine - San Joaquin Fruit Co.	NR	33-42-56	117-46-06	198	1921	1974	The Irvine Co.
62	Irvine - Aliso	NR	33-43-00	117-44-00	90	1910	1944	Private Observer
63	Delhi - Holly Sugar	S	33-42-33	117-51-15	65	1923	1982	Private Observer
64	Santa Ana - Hill and Son	NR	33-45-00	117-52-00	125	1908	1941	Private Observer
65	Tustin Union High School	S	33-44-12	117-49-06	100	1924	1963	Private Observer
68	Santa Ana - Campbell	S	33-46-24	117-50-24	210	1918	1963	Private Observer
69	Orange - Armour	S	33-46-58	117-51-03	200	1895	1933	Private Observer
70	Villa Park Central Lemon Assoc.	NR	38-48-20	117-49-36	290	1919	1959	Private Observer
71	El Modena - Hewes Ranch	NR	33-47-00	117-48-30	280	1918	1958	Private Observer
72	Irvine - Peters Canyon Dam	NR	33-46-00	117-46-00	550	1918	1958	Private Observer

Table 1 - continued

HISTORICAL PRECIPITATION STATIONS

Sta. No.	Station Name	Equip Type	North Latitude	West Longitude	Elev Feet	Record Begins	Record Ends	Cooperator
74	Irvine Ranch Limestone Cyn	S	33-45-27	117-42-30	855	1918	1987	The Irvine Co.
76	Santiago Canyon - Pleasents Ranch	NR	33-43-45	117-38-54	1145	1894	1933	Private Observer
77	Silverado - Holtz	NR	33-44-42	117-38-24	1275	1919	1964	Private Observer
78	Silverado - Camp Silverado	S	33-45-00	117-34-00	2000	1930	1962	Private Observer
81	Trabuco Canyon - Robinson	NR	33-39-12	117-34-14	1150	1926	1967	Private Observer
82	Bell Canyon - Hare and Starr Ranch	S	33-38-00	117-34-00	1250	1930	1946	Private Observer
86	San Juan Capistrano - Hankey	S	33-30-45	117-38-16	150	1905	1977	Private Observer
89	Huntington Beach - Union Oil	NR	33-41-00	118-00-00	65	1925	1940	Private Observer
90	Brea - Union Oil	NR	33-55-49	117-54-53	375	1925	1966	Private Observer
91	Anaheim Carroll Ranch	S	33-49-54	117-57-49	105	1924	1977	Private Observer
92	San Juan Substation	S	33-30-44	117-39-56	160	1923	1976	Private Observer
93	Fullerton Pumping Station	NR	33-50-52	117-55-34	150	1931	1991	City of Fullerton
94	Union Oil, Naranjal	NR	33-55-30	117-57-18	500	1927	1940	Private Observer
95	G and L Union Oil Pumping Station	NR	33-54-12	117-52-12	360	1927	1940	Private Observer
98	Puente Hill-Weisel	S	33-57-08	117-55-26	625	1925	1987	LACDPW
101	Richfield Union Oil Pumping Station	NR	33-52-28	117-50-30	300	1926	1940	Private Observer
103	Huntington Beach - Murdy Ranch	NR	33-43-24	118-00-42	5	1925	1966	Private Observer
104	Trabuco Canyon - Refractory	NR	33-40-24	117-34-48	1500	1932	1941	Private Observer
106	Wintersburg - Moore	NR	33-43-09	118-00-21	15	1922	1945	Private Observer
107	Huntington Beach - American Sugar	NR	33-44-06	118-00-24	30	1907	1958	Private Observer
108	La Habra - Zinn Laboratory	NR	33-55-00	117-56-00	287	1931	1949	Private Observer
109	Villa Park Ochard Association	NR	33-48-53	117-49-20	300	1928	1980	Private Observer
111	Full. Sunny Hills Ranch, Viejo	NR	33-54-18	117-55-24	310	1937	1947	Private Observer
113	Full. Sunny Hills Ranch, Red Tank	NR	33-54-30	117-56-18	390	1937	1947	Private Observer
114	Full. Sunny Hills Ranch, Lemon Mesa	NR	33-53-06	117-57-12	228	1937	1947	Private Observer
115	Full. Sunny Hills Ranch, Laboratory	NR	33-53-36	117-55-42	290	1937	1947	Private Observer
116	Garden Grove - County Yard	S	33-46-02	117-56-00	82	1938	1970	City of Garden Grove
125	Irvine	R	33-40-28	117-45-22	197	1936	1988	PFRD
126	Fullerton Airport	R	33-52-23	117-58-24	101	1935	1988	PFRD
127	Huntington Beach Heil Evaporation	S	33-43-24	118-02-12	15	1934	1945	PFRD
128	Los Alamitos S.C.E. Substation	S	33-48-36	118-04-09	26	1938	1950	Private Observer
129	S.A.V.I. Office, Orange	NR	43-46-50	117-51-20	160	1931	1944	Private Observer
130	El Toro - Alios Ranch	NR	33-39-50	117-40-05	640	1929	1977	Private Observer
131	San Clemente Fire Station	S	32-25-38	117-36-31	260	1931	1977	City of San Clemente
132	El Modena	R	33-48-28	117-46-36	455	1938	1938	NWS
135	Huntington Beach Ranch Company	R	33-40-48	117-59-49	75	1933	1984	Private Observer
136	Olive Heights	NR	33-50-17	117-50-43	245	1939	1984	Private Observer
138	Brea Canyon - Diamond Bar Ranch	NR	33-58-00	117-51-00	750	1930	1959	Private Observer
139	Santa Ana Canyon - Ehman Ranch	NR	33-51-12	117-46-48	320	1935	1959	Private Observer
142	Lemon Heights	NR	33-45-26	117-46-51	380	1944	1980	Private Observer
143	Irvine - Salt Works	NR	33-39-14	117-51-52	10	1944	1969	Private Observer
146	Lambert Reservoir	R	33-41-41	117-42-39	480	1945	1989	PFRD
148	Orange - U.S. Forest Service	S	33-47-17	117-50-26	200	1942	1980	USFS
151	Aliso Canyon - Cook's Corner	S	33-40-59	117-37-12	1080	1945	1975	Private Observer
158	Los Alamitos	S	33-48-35	118-04-35	24	1950	1988	Private Observer

Table 1 - continued

HISTORICAL PRECIPITATION STATIONS

Sta. No.	Station Name	Equip Type	North Latitude	West Longitude	Elev Feet	Record Begins	Record Ends	Cooperator
160	Cypress - Lowery	NR	33-49-48	118-02-18	41	1951	1963	Private Observer
161	Santa Ana - Scudder	S	33-45-07	117-53-22	99	1954	1978	Private Observer
162	Westminster	R	33-45-07	117-59-26	38	1955	1988	PFRD
164	Capistrano Beach	R	33-28-03	117-41-02	20	1955	1988	PFRD
166	Tustin	R	33-44-53	117-48-38	128	1957	1974	PFRD
167	Anaheim - Agriculture Dept.	R	33-49-12	117-54-48	145	1957	1989	PFRD
171	El Modena - Hower	S	33-47-18	117-48-03	310	1959	1984	Private Observer
172	Fullerton - County Yard	S	33-52-05	117-54-38	163	1959	1970	PFRD
175	Orange - Campbell	NR	33-47-27	117-50-22	220	1963	1970	Private Observer
180	Silverado - Felder	NR	33-44-45	117-36-02	1550	1956	1971	Private Observer
181	Modjeska Canyon - McArthur	NR	33-42-28	117-37-39	1300	1963	1993	Private Observer
182	Hincky Canyon - Joplin Boys Ranch	NR	33-40-43	117-34-23	1720	1963	1974	Private Observer
183	Brea City Fire Dept.	S	33-54-53	117-54-04	351	1965	1986	City of Brea
187	Stanton City Yard	S	33-46-26	118-00-27	55	1966	1975	City of Stanton
189	Long Beach - Lees Street	R	33-46-40	118-06-05	10	1964	1974	LACDPW
191	Santa Ana Fire Station	S	33-44-39	117-52-02	115	1907	1984	NWS/City of Santa Ana
196	Irvine Country Club	NR	33-36-43	117-52-56	105	1969	1976	The Irvine Co.
197	Bryant Ranch	S	33-52-32	117-42-28	425	1965	1988	Private Observer
198	Oak Flat	R	33-49-15	117-38-18	2700	1969	1989	PFRD
201	Mission Viejo Cow Camp	NR	33-31-21	117-35-31	300	1969	1989	Private Observer
203	Moulton Niguel Water District	S	33-34-41	117-40-23	300	1969	1985	Water District Personnel
204	Green River Golf Course	S	33-52-24	117-40-15	460	1969	1994	Private Observer
207	Coto de Caza	NR	33-35-14	117-35-05	970	1971	1988	Private Observer
210	Silverado Canyon - Guard	NR	33-44-48	117-36-55	1410	1971	1997	Private Observer
211	Laguna Niguel-South County Garage	S	33-31-29	117-42-58	350	1973	1988	O.C. Garage Personnel
217	Huntington Beach - James	S	33-43-33	118-02-37	9	1974	1988	Private Observer
218	Long Beach #1	R	33-46-46	118-08-36	15	1925	1980	LACDPW
221	San Juan Capistrano - Lacouague	R	33-30-33	117-37-55	140	1979	1988	PFRD/Private Observer
226	O.C. Fire Station #15	S	33-46-16	117-44-24	300	1977	1988	PFRD
228	San Clemente - Smith	NR	33-25-00	117-36-50	100	1962	1988	Private Observer

Type: S- Standard 8 inch Non-recording Gage NR - Non-Recording Gage Other Than Standard Gage R - Automatic Recording Gage

Table 2

ACTIVE RECORDING/NON-RECORDING PRECIPITATION STATIONS

Sta. No.	Station Name	Equip Type	North Latitude	West Longitude	Elev Feet	Record Begins	Cooperator
4	La Mirada Standard Oil	R	33-52-59	118-01-00	64	1925	LACDPW
5	Buena Park	S	33-51-28	117-59-29	79	1926	City of Buena Park
18	Diamond Bar Fire Station	R	33-59-29	117-48-35	720	1930	LACDPW
45	Huntington Beach Fire Station	S	33-39-50	117-59-48	32	1927	City of Huntington Beach
61	Tustin - Irvine Ranch	S	33-43-46	117-46-58	118	1897	NWS/Treasure Farms
88	Newport Beach Harbor Master	S	33-36-16	117-53-00	8	1921	NWS/O.C. Sheriff
96	Fullerton Hillcrest Reservoir	S	33-53-00	117-55-12	320	1933	City of Fullerton
99	Laguna Beach Lumber Company	S	33-23-33	117-46-55	30	1926	Private Observer
100	Laguna Beach Treatment Plant	S	33-32-49	117-46-53	50	1928	NWS/City of Laguna Beach
118	Santiago Dam	R	33-47-13	117-43-16	855	1932	NWS/COE
119	Silverado Ranger Station	R	33-44-34	117-39-29	1095	1938	NWS/USFS
121	Santa Ana - OCEMA	R	33-45-04	117-52-11	170	1933	OCPFRD
133	Trabuco Canyon	R	33-39-26	117-36-00	970	1939	NWS/OCPFRD
134	San Juan Guard Station	R	33-35-30	117-30-47	728	1939	NWS/OCPFRD
141	Laguna Beach Number 2	R	33-33-03	117-48-01	64	1940	NWS/City of Laguna
144	Orange County Reservoir, Brea	R	33-56-07	117-52-58	660	1943	NWS/COE
145	Prado Dam	R	33-53-25	117-38-10	550	1942	NWS/COE
152	La Habra Fire Station	R	33-55-53	117-57-13	287	1926	City of La Habra
153	Fullerton Dam	R	33-53-50	117-53-07	340	1946	NWS/COE
154	Brea Dam	R	33-52-25	117-55-30	275	1946	NWS/COE
156	Santiago Peak	R	33-42-39	117-31-59	5660	1949	NWS/OCPFRD
163	Yorba Reservoir	R	33-52-19	117-48-37	394	1955	OCPFRD
165	Costa Mesa	R	33-40-07	117-53-35	53	1955	OCPFRD
169	Corona Del Mar	R	33-36-35	117-51-27	300	1959	OCPFRD
170	Los Alamitos Basin	R	33-45-24	118-05-43	7	1958	OCPFRD
173	Villa Park Dam	R	33-48-53	117-46-00	566	1961	OCPFRD
174	Atwood - O.C. Water Dist.	S	33-51-33	117-49-04	260	1963	Water District Personnel
176	El Toro	R	33-37-39	117-41-26	445	1964	OCPFRD
178	El Toro - James A. Musick	S	33-39-52	117-41-43	520	1965	Private Observer
184	Garden Grove	S	33-46-35	117-55-49	120	1964	City of Garden Grove
185	Carbon Canyon - Gilman	R	33-55-24	117-46-31	1625	1954	NWS/COE
186	San Clemente - Palisades Reservoir	S	33-27-46	117-39-02	360	1965	Private Observer
188	Carbon Canyon - Workman	R	33-57-30	117-46-42	1100	1949	NWS/COE
190	La Habra Heights Mutual Water Co.	R	33-56-55	117-57-50	455	1964	LACDPW
192	El Cariso Guard Station	R	33-39-00	117-24-43	2660	1965	NSFS/RCFCWCD
206	Trabuco Forestry	S	33-39-15	117-35-34	970	1971	O.C. Fire Authority
209	Anaheim - OCEMA Katella Yard	NR	33-48-11	117-52-34	160	1964	OCPFRD
212	Anaheim - Lewis Substation	NR	33-48-37	117-53-51	150	1973	Private Observer
214	Modjeska Canyon - Tucker Wildlife	R	33-42-35	117-37-08	1200	1974	OCPFRD
216	Laguna Niguel - Sulphur Creek Dam	R	33-32-59	117-42-20	200	1974	OCPFRD
219	Costa Mesa Water District	S	33-38-46	117-55-54	30	1978	Water District Personnel
222	Orange - Hardacre	NR	33-48-53	117-49-20	298	1980	Private Observer
229	Garden Grove Fire Station	R	33-47-26	117-58-03	80	1985	OCPFRD
231	Pelican Hills Golf Course	R	33-35-30	117-51-00	250	1993	Private Observer
234	Moulton Niguel Water District	S	33-34-36	117-40-20	300	1994	Water District Personnel

Type: S- Standard 8 inch Non-recording Gage NR - Non-Recording Gage Other Than Standard Gage R - Automatic Recording Gage

Table 3

ACTIVE ALERT STATIONS

Sta. No.	Station Name	Equip Type	North Latitude	West Longitude	Elev Feet	Record Begins
201	Santiago Peak	S	33-42-39	117-31-59	5660	1982
203	Portola Park	P	33-46-00	117-50-33	182	1991
205	Santiago Peak	P	33-42-39	117-31-59	5660	1982
206	Alico Creek @ Jeronimo	W	33-37-30	117-41-07	455	1983
207	El Toro	P	33-37-30	117-44-14	455	1983
209	San Juan Guard	P	33-35-19	117-30-54	660	1983
212	Oso Creek @ Crown Valley	W	33-33-28	117-40-32	260	1983
213	Oso Creek @ Crown Valley	P	33-33-28	117-40-32	260	1983
214	San Juan Creek	W	33-29-30	117-39-43	75	1984
215	San Juan Capistrano	P	33-29-30	117-39-43	75	1984
217	Lambert Reservoir	P	33-41-41	117-42-39	450	1989
219	Santa Ana Engineering	P	33-45-04	117-52-11	170	1989
220	Villa Park Dam	P	33-48-59	117-46-00	560	1983
221	Villa Park Dam	A	33-48-59	117-46-00	560	1983
223	Katella Yard	P	33-48-11	117-52-34	160	1988
225	Santiago Creek, Santa Ana	W	33-46-09	117-52-54	120	1989
226	Santiago Creek, Santa Ana	P	33-46-09	117-52-54	120	1989
231	Lower Oso Creek	W	33-32-34	117-40-33	220	1994
232	Lower Oso Creek	P	33-32-34	117-40-33	220	1994
233	Modjeska Canyon	P	33-42-32	117-38-05	1260	1984
238	Westminster Channel @ Beach	W	33-45-07	117-59-26	40	1989
239	Westminster Channel @ Beach	P	33-45-07	117-59-26	40	1989
240	Miller Basin	W	33-51-53	117-51-09	220	1983
241	Miller Basin	P	33-51-53	117-51-09	220	1983
244	Prado Dam Outflow	W	33-53-00	117-38-39	460	1983
245	Prado Dam	P	33-53-00	117-38-39	460	1983
248	Coto De Caza	P	33-37-44	117-35-00	730	1993
251	Oak Flat	P	33-49-46	117-38-19	2700	1983
252	El Modena - Irvine @ Michelle	W	33-43-12	117-47-54	70	1989
253	El Modena - Irvine @ Michelle	P	33-43-12	117-47-54	70	1989
254	Brookhurst Tide	W	33-38-12	117-57-12	0	1992
256	Lower Silverado Canyon	P	33-44-33	117-39-28	1100	1984
258	Magnolia Tide	W	33-38-30	117-58-10	7	1984
260	EGG-Wintersburg	W	33-43-02	117-59-57	20	1983
261	Huntington Beach	P	33-43-02	117-59-57	20	1983
263	Corona Del Mar	P	33-36-45	117-51-27	300	1984
265	Brea	P	33-55-19	117-54-04	340	1983
267	Placentia Basin	W	33-51-30	117-53-00	190	1984
270	Yorba Park	P	33-52-00	117-46-11	300	1988
274	Sand Canyon	P	33-40-38	117-45-33	200	1989
277	Fullerton Creek	P	33-51-47	117-55-55	95	1988
282	Peters Canyon Wash @ Barranca	W	33-41-40	117-49-16	25	1987
283	Peters Canyon Wash @ Barranca	P	33-41-40	117-49-16	40	1987
287	Oceanview	W	33-43-12	117-55-54	43	1993
288	Oceanview	P	33-43-12	117-55-54	43	1993
290	Raymond Basin	W	33-50-52	117-54-31	165	1988
292	Alameda Storm Ch.	W	33-48-21	117-48-06	339	1989
293	Alameda Storm Ch.	P	33-48-21	117-48-06	339	1989
294	Anaheim Agriculture	P	33-49-12	117-54-48	148	1989
297	Upper Oso Creek	P	33-39-13	117-39-21	420	1991
805	Riverside Flood Control	P	33-58-49	117-21-47	830	1983
810	Gavilan Hills	P	33-47-23	117-23-46	2040	1983
819	Chino Creek	W	34-00-43	117-43-47	715	1984

Table 3 - continued

ACTIVE ALERT STATIONS

Sta. No.	Station Name	Equip Type	North Latitude	West Longitude	Elev Feet	Record Begins
820	Chino Creek	P	34-00-43	117-43-47	715	1984
825	Cucamonga Creek	P	34-01-50	117-36-00	820	1984
828	San Antonio Dam	P	34-09-23	117-40-54	2000	1985
832	Camp Angelus	P	34-09-00	116-58-40	5780	1984
1100	Lacouaque	P	33-30-33	117-37-55	141	1990
1105	Bolsa Chica Channel	W	33-45-33	118-02-30	7	1990
1110	Santa Ana - Delhi Channel	W	33-39-36	117-52-49	24	1989
1111	Santa Ana - Delhi Channel	P	33-39-36	117-52-49	24	1989
1116	Anaheim - Barber City	W	33-45-16	118-02-04	7	1990
1117	Anaheim - Barber City	P	33-45-16	118-02-04	20	1990
1119	Laguna Beach @ Woodland	W	33-33-11	117-46-26	67	1990
1120	Laguna Beach @ Woodland	P	33-33-21	117-46-45	600	1990
1124	San Diego Crk. @ Campus	W	33-39-20	117-50-42	10	1990
1125	San Diego Crk. @ Campus	P	33-39-20	117-50-42	20	1990
1130	Laguna Audubon	P	33-36-04	117-44-36	314	1990
1133	Laguna Audubon	W	33-36-04	117-44-36	314	1992
1135	Santiago Creek @ E08	W	33-42-47	117-38-42	1220	1993
1136	Santiago Creek @ E08	P	33-42-47	117-38-42	1220	1993
1140	Fullerton Airport	P	33-52-23	117-58-24	95	1990
1141	Upper Aliso Creek	P	33-38-20	117-40-12	560	1991
1145	Pico Retarding Basin-San Clemente	P	33-24-32	117-35-10	250	1993
1150	Costa Mesa	P	33-40-07	117-53-35	47	1990
1152	Laguna Niguel Park	P	33-32-49	117-42-25	200	1991
1155	Segunda Desheca	P	33-26-10	117-35-30	85	1993
1160	El Cariso Guard Station	P	33-37-30	117-24-42	2600	1990
1165	Yorba Reservoir	P	33-52-19	117-48-37	300	1990
1170	Upper Silverado Canyon	P	33-44-50	117-32-34	2880	1990
1175	Garden Grove	P	33-47-58	117-58-03	80	1990
1177	Fullerton Crk @ Beach	W	33-51-45	117-59-53	75	1995
1178	Fullerton Crk @ Beach	P	33-51-45	117-59-53	75	1995
1180	Gilbert Retention Basin	P	33-50-20	117-57-42	100	1990
1182	Irvine Lake Dam	W	33-47-00	117-43-34	820	1983
1187	Upper East Garden Grove Wintersburg	W	33-47-10	117-54-03	120	1993
1188	Upper East Garden Grove Wintersburg	P	33-47-10	117-54-03	120	1993
1190	Trabuco Creek at Camino Capo	W	33-31-34	117-40-07	200	1983
1194	San Diego Creek @ Culver	W	33-40-54	117-48-31	54	1990
1195	San Diego Creek @ Culver	P	33-40-54	117-48-31	70	1990
8014	Seal Beach Pump Station	P	33-44-30	118-07-00	5	1988
8018	Seal Beach Pump Station	W	33-44-30	118-07-00	5	1988
8036	Cypress Pump Station	P	33-49-07	118-03-32	30	1988
8041	Cypress Pump Station	W	33-49-07	118-03-32	30	1988
8085	Huntington Beach Pump Station	P	33-40-19	117-59-00	5	1988
8089	Huntington Beach Pump Station	W	33-40-19	117-59-00	5	1988
8110	Harbor at Edinger SAR Pump Station	P	33-43-05	117-55-12	50	1992
8114	Harbor at Edinger SAR Pump Station	W	33-43-05	117-55-12	50	1992
8132	Los Alamitos Pump Station	P	33-45-24	118-45-43	7	1992
8136	Los Alamitos Pump Station	W	33-45-24	118-45-43	7	1992
800	series stations are outside Orange County					
	P = Precipitation				A = Anemometer - Wind Velocity	
	W = Water Level				S = Snow	

Table 4

PRECIPITATION SUMMARY
For
SELECTED STATIONS
(1998-1999)

NO	NAME	SEASON TOTAL (Inches)	DAYS OF PRECIPITATION PRESENT SEASON	MAXIMUM SEASON RAINFALL INCHES	YEAR	MINIMUM SEASON RAINFALL INCHES	YEAR	MEAN (no. of complete service years)
5	Buena Park	8.45	30	34.10	1977-78	3.32	1960-61	13.55 (70)
61	Tustin-Irvine Ranch	8.60	24	34.72	1997-98	4.12	1960-61	12.82 (102)
88	Newport Beach Harbor	5.39	35	28.17	1940-41	3.00	1960-61	11.58 (78)
96	Fullerton - Hillcrest	8.41	32	36.19	1940-41	4.27	1960-61	14.50 (68)
100	Laguna Beach	9.60	47	35.08	1997-98	4.12	1960-61	12.79 (67)
121	Santa Ana - OCPFRD	7.55	31	32.14	1940-41	3.56	1960-61	13.15 (91)
163	Yorba Reservoir	7.26	23	32.81	1977-78	4.58	1960-61	14.54 (43)
165	Costa Mesa	6.65	28	29.11	1997-98	3.73	1960-61	12.42 (44)
169	Corona Del Mar	6.70	31	31.88	1997-98	2.94	1960-61	12.73 (39)
170	Los Alamitos	7.55	27	22.09	1977-78	2.73	1960-61	10.34 (40)
173	Villa Park Dam	8.05	38	34.89	1997-98	7.21	1971-72	15.50 (38)
176	El Toro	7.52	27	38.58	1997-98	7.52	1998-99	15.41 (35)
186	Palisades Reservoir	7.99	28	28.70	1997-98	6.36	1971-72	13.59 (32)
208	Santiago Peak	26.30	56	106.15	1997-98	11.43P	1960-61	35.02 (50)P
206	Trabuco Forestry	10.27	27	43.58	1997-98	9.81	1980-81	20.80 (29)
216	Sulphur Creek Dam	8.82	27	35.32	1997-98	7.24	1980-81	14.96 (25)
222	Orange - Hardacre	7.90	42	33.63 D	1977-78	3.90 D	1960-61	14.19 (71)
229	Garden Grove Fire	8.14	29	28.02	1997-98	6.01	1986-87	13.10 (14)

D = Data from nearby Station - #109 V.P. Orchard Assoc.

P = Prior to 1996 Season data taken from NWS #156

Table 5
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Buena Park - Sta. 5

GAGE ELEVATION: 79' LATITUDE 33-51-28
 SEASON TOTAL: 8.45 LONGITUDE 117-59-29
 RECORDS: 1927 to Present 40 YEAR BASE PERIOD: 1960-1999
 MEAN: * 13.55 MEAN: 13.95
 SEASON AS %: 62.3 SEASON AS %: 60.6

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1													1
2													2
3													3
4													4
5													5
6													6
7													7
8													8
9													9
10													10
11													11
12													12
13													13
14													14
15													15
16													16
17													17
18													18
19													19
20													20
21													21
22													22
23													23
24													24
25													25
26													26
27													27
28													28
29													29
30													30
31													31
	0.00	0.00	0.00	0.00	1.40	0.95	1.85	0.60	1.10	2.20	0.00	0.35	

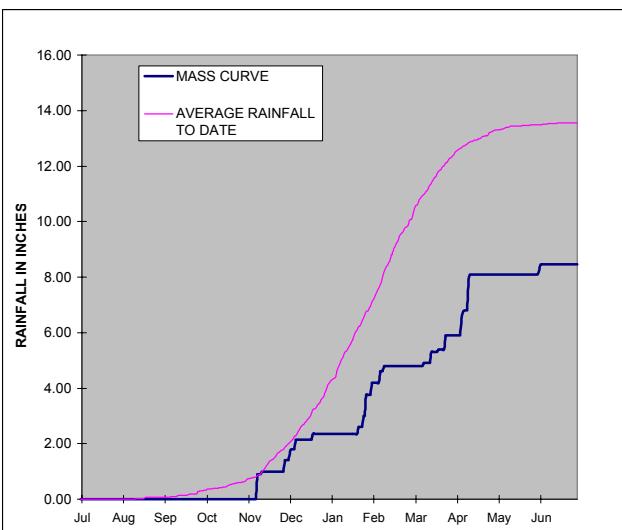
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 8.45 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

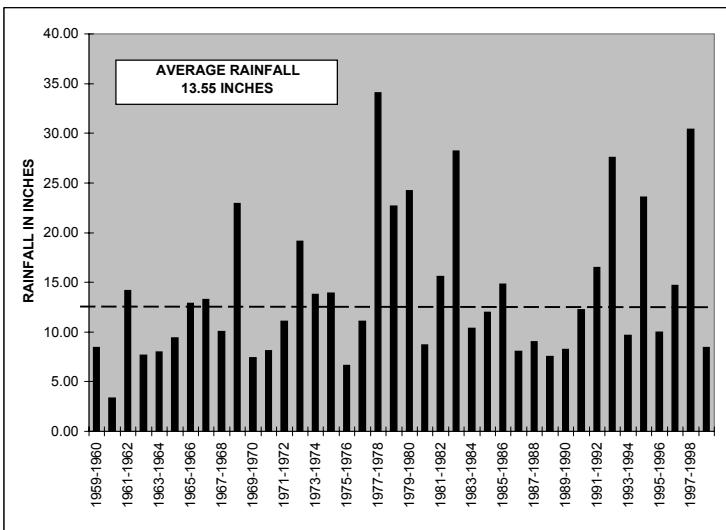


Table 6
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Tustin - Irvine Ranch - Sta. 61

GAGE ELEVATION: 118' LATITUDE 33-43-46
 SEASON TOTAL: 8.60 LONGITUDE 117-46-58
 RECORDS: 1898 to Present 40 YEAR BASE PERIOD: * 1959-1999
 MEAN: * 12.82 MEAN: 13.09
 SEASON AS %: 67.1 SEASON AS %: 65.7

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1													1
2													2
3													3
4							0.23		0.05				4
5									0.17				5
6								0.31	0.16	0.39			6
7										0.28			7
8										0.89			8
9													9
10									0.19				10
11										0.08	0.67		11
12													12
13													13
14													14
15										0.29			15
16													16
17													17
18													18
19							0.37						19
20								0.18	0.09				20
21													21
22													22
23													23
24													24
25								0.47	0.68				25
26								0.12					26
27								1.09					27
28								0.42					28
29													29
30													30
31								0.33					31
	0.00	0.00	0.36	0.00	1.42	1.58	2.19	0.52	1.19	1.34	0.00	0.00	

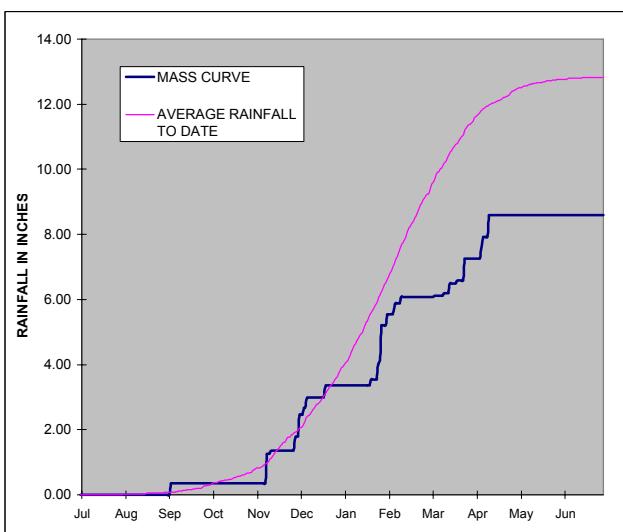
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A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 8.60 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

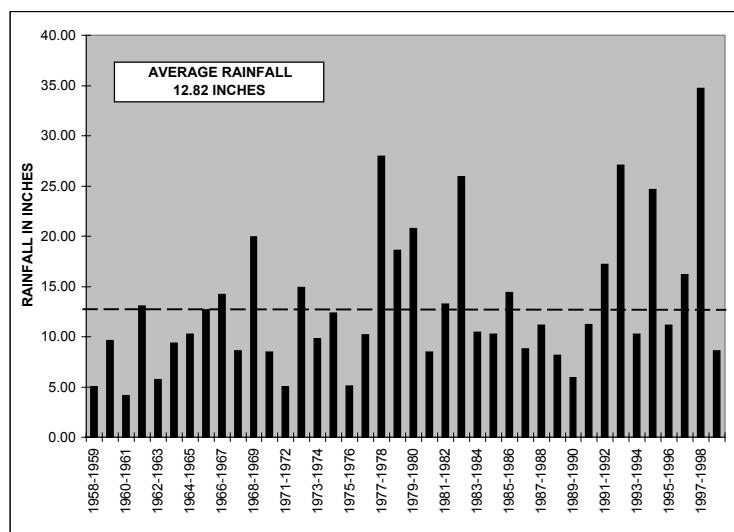


Table 7
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Newport Beach Harbor Master - Sta. 88

GAGE ELEVATION: 8'
 SEASON TOTAL: 5.39
 RECORDS: 1922 to Present
 MEAN: 11.58
 SEASON AS %: 46.6

DAY	LATITUDE 33-36-16												DAY
	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1							0.22						1
2												0.02	2
3												0.02	3
4							0.03					0.02	4
5								0.20	0.12				5
6							0.10			0.14			6
7								0.16	0.14				7
8							0.54						8
9								0.02	0.02	0.04			9
10								0.08					10
11							0.05		0.15	0.06			11
12									0.88				12
13													13
14							0.01						14
15								0.19					15
16							0.02						16
17													17
18													18
19													19
20							0.15	0.04					20
21								0.01					21
22													22
23									0.01				23
24													24
25							0.40	0.52					25
26							0.15	0.11					26
27							0.20						27
28							0.24						28
29							0.06						29
30													30
31							0.27						31
	0.00	0.00	0.00	0.00	0.89	0.56	1.17	0.22	1.22	1.26	0.01	0.06	

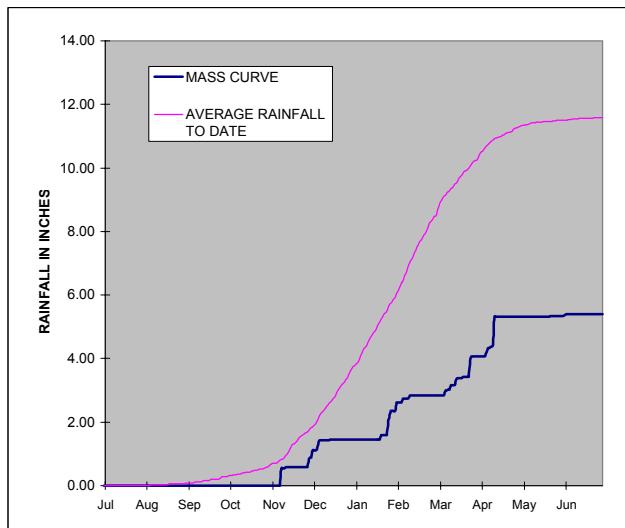
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 5.39 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

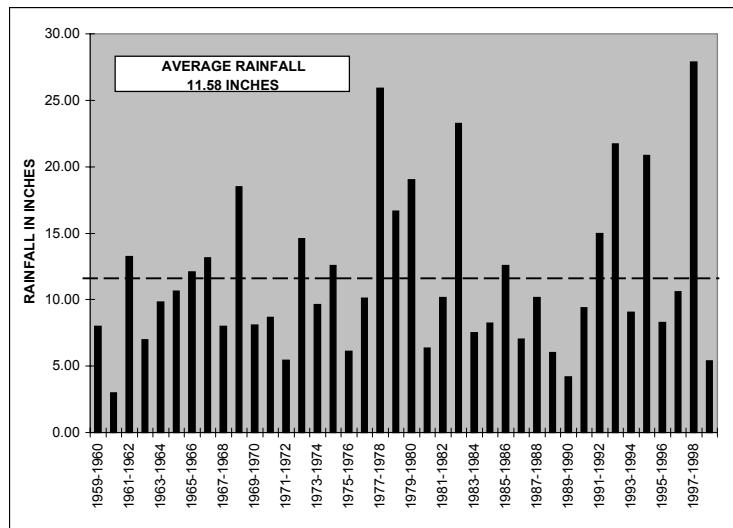


Table 8
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Fullerton Hillcrest Res. - Sta. 96

GAGE ELEVATION: 320' LATITUDE 33-53-00
 SEASON TOTAL: 8.41 LONGITUDE 117-55-12
 RECORDS: 1932 to Present 40 YEAR BASE PERIOD: * 1958-1999
 MEAN: * 14.50 MEAN: 14.54
 SEASON AS %: 58.0 SEASON AS %: 57.8

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1							0.28						0.26 1
2		T											0.04 2
3					T								3
4						0.13	0.28						4
5						0.30	0.08						5
6								0.74					6
7							0.86						7
8								0.16					8
9								0.11					9
10								0.31 0.09					10
11								1.15					11
12													12
13							0.09						13
14							0.12						14
15							0.58						15
16													16
17													17
18													18
19							0.21						19
20								0.11					20
21													21
22								0.03					22
23								0.05					23
24							0.47						24
25							0.03	0.32					25
26							0.66						26
27							0.38						27
28							0.15						28
29													29
30													30
31							0.34						31
	0.00	0.00	0.00	0.00	1.47	0.92	1.71	0.67	1.10	2.21	0.03	0.30	

---LEGEND---
 A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 8.41 "

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1957-1958	0.03	0.00	0.00	2.27	1.22	3.07	1.75	6.70	4.44	4.29	0.00	0.10	23.87
1958-1959	0.00	0.56	0.43	0.04	0.07	0.00	1.67	3.01	0.00	0.52	0.00	0.00	6.30
1959-1960	0.00	0.00	0.00	0.00	0.12	1.59	3.09	2.85	0.58	1.06	0.10	0.00	9.39
1960-1961	0.00	0.00	0.00	0.50	1.97	0.14	1.18	0.01	0.43	0.04	0.00	0.00	4.27
1961-1962	0.02	0.00	0.00	0.00	1.27	1.79	2.45	9.12	0.74	0.00	0.43	0.00	15.82
1962-1963	0.00	0.00	0.00	0.06	0.01	0.02	0.21	4.45	2.30	1.26	0.00	0.26	8.57
1963-1964	0.00	0.04	2.27	0.41	3.20	0.00	1.15	0.05	1.72	0.50	0.12	0.16	9.62
1964-1965	0.00	0.00	0.00	0.39	1.42	1.56	0.59	0.18	2.24	4.45	0.04	0.03	10.90
1965-1966	0.03	0.00	1.07	0.00	7.60	3.55	0.91	1.37	0.49	0.02	0.02	0.00	15.06
1966-1967	0.00	0.00	0.11	0.01	3.13	5.18	4.10	0.00	1.75	3.09	0.02	0.03	17.42
1967-1968	0.00	0.00	0.68	0.00	4.31	1.62	1.14	0.53	3.11	0.58	0.05	0.00	12.02
1968-1969	0.11	0.00	0.00	0.22	0.33	1.54	11.84	9.61	1.42	0.70	0.08	0.02	25.87
1969-1970	0.12	0.00	0.00	0.00	2.10	0.18	2.34	2.28	2.09	0.00	0.00	0.04	9.15
1971-1972	0.00	0.00	0.00	0.48	0.21	5.47	0.00	0.06	0.00	0.28	0.07	0.41	6.98
1972-1973	0.00	0.00	0.11	0.81	4.22	1.67	2.99	5.51	3.68	0.00	0.00	0.00	18.99
1973-1974	0.00	0.01	0.13	1.80	0.59	7.11	0.18	3.54	0.28	0.19	0.00	0.00	13.83
1974-1975	0.00	0.00	0.00	0.66	0.05	3.66	0.15	2.62	4.05	1.69	0.02	0.00	12.90
1975-1976	0.00	0.00	0.00	0.36	0.36	0.19	0.00	3.48	1.64	1.59	0.08	0.41	8.11
1976-1977	0.02	0.00	2.77	0.02	0.57	0.98	1.69	0.74	1.17	0.00	2.32	0.01	10.29
1977-1978	0.00	0.00	1.13	0.19	1.96	2.09	5.64	2.64	4.45	0.00	0.00	0.00	18.10
1978-1979	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1979-1980	0.00	0.00	0.00	1.02	0.33	0.39	8.88	10.79	4.14	0.48	0.22	0.00	26.25
1980-1981	0.00	0.00	0.00	0.00	0.00	0.91	2.80	1.80	3.71	0.41	0.06	0.00	9.69
1981-1982	0.00	0.00	0.00	0.95	3.54	0.53	3.13	0.60	6.13	0.66	0.15	0.03	15.72
1982-1983	0.00	0.01	0.55	0.29	3.65	1.60	3.95	6.01	7.65	3.73	0.02	0.02	27.48
1983-1984	0.00	0.06	2.46	0.98	3.78	2.04	0.38	0.00	0.14	0.67	0.00	0.00	11.51
1984-1985	0.00	0.08	0.32	0.12	2.39	5.70	1.37	1.62	1.23	0.03	0.13	0.00	12.99
1985-1986	0.00	0.00	0.41	0.27	4.21	0.32	2.38	5.29	3.60	0.62	0.00	0.00	17.10
1986-1987	0.20	0.00	1.84	0.33	0.95	0.28	3.56	1.07	1.11	0.22	0.00	0.01	9.57
1987-1988	0.01	0.17	0.00	2.00	0.61	2.09	1.82	1.21	0.05	2.51	0.00	0.00	10.47
1988-1989	0.00	0.00	0.13	0.00	1.17	4.74	0.62	1.69	1.17	0.02	0.00	0.04	9.58
1989-1990	0.00	0.00	0.36	0.53	0.29	0.00	1.82	4.04	0.17	0.82	0.66	0.04	8.73
1990-1991	0.00	0.00	0.00	0.00	0.38	0.07	1.77	4.56	5.52	0.03	0.00	0.00	12.33
1991-1992	0.12	0.00	0.06	0.49	0.05	1.94	1.89	8.31	6.83	0.07	0.00	0.00	19.76
1992-1993	0.25	0.00	0.00	0.88	0.00	6.47	11.54	6.92	2.27	0.00	0.16	1.06	29.55
1993-1994	0.00	0.00	0.00	0.11	1.09	1.11	0.43	3.92	2.45	1.25	0.32	0.00	10.68
1994-1995	0.00	0.00	0.00	0.32	1.10	0.62	12.57	1.01	7.01	0.72	0.37	1.26	24.98
1995-1996	0.00	0.00	0.00	0.00	0.04	1.44	2.10	4.68	2.16	0.87	0.00	0.00	11.29
1996-1997	0.00	0.00	0.00	1.23	2.95	4.97	6.81	0.30	0.00	0.00	0.00	0.00	16.26
1997-1998	0.00	0.00	0.74	0.06	2.43	4.50	3.33	12.96	4.46	0.66	2.66	0.03	31.83
1998-1999	0.00	0.00	0.00	0.00	1.47	0.92	1.71	0.67	1.10	2.21	0.03	0.30	8.41
Totals	0.91	1.92	15.45	16.13	66.35	75.53	122.86	132.84	100.74	36.33	8.32	4.26	581.64
Average	0.02	0.05	0.39	0.40	1.66	1.89	3.07	3.32	2.52	0.91	0.21	0.11	14.54
Max	0.25	1.06	2.77	2.27	7.60	6.47	12.57	12.96	7.65	4.45	2.66	1.26	31.83

* 1970-1971 and 1977-1978 not included

REMARKS _____

SEASON TOTAL 8.41 "

SEASON TOTALS vs. AVERAGE RAINFALL

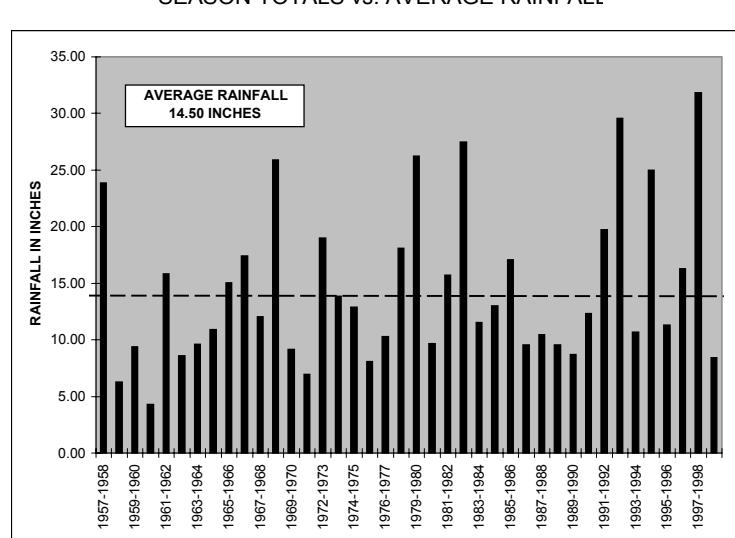
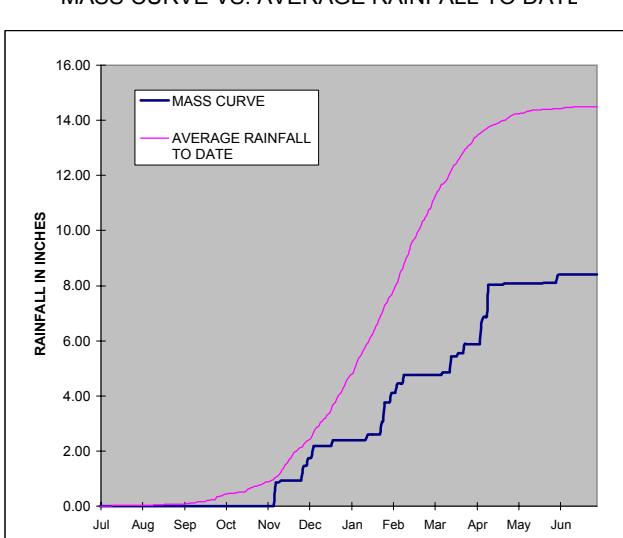


Table 9
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Laguna Beach Treatment Plant - Sta. 100

GAGE ELEVATION: 50'
 SEASON TOTAL: 9.60
 RECORDS: 1929 to Present
 MEAN: * 12.79
 SEASON AS %: 75.1

LATITUDE 33-32-49
 LONGITUDE 117-46-53
 40 YEAR BASE PERIOD: * 1956-1999
 MEAN: 13.44
 SEASON AS %: 71.4

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1		T			0.70								1
2					0.08						0.20	2	
3		0.10									T	3	
4					0.30	0.06	0.10				0.10	4	
5		0.45			0.05	0.22						5	
6					0.20	T	0.09					6	
7						0.02	0.27					7	
8					0.99		0.01	T				8	
9						0.05	0.01	0.07				9	
10					0.09		0.15					10	
11						0.14	0.10					11	
12							0.78					12	
13												13	
14												14	
15							0.27					15	
16							0.03					16	
17												17	
18												18	
19				0.29								19	
20			T	0.50								20	
21					0.05							21	
22												22	
23						0.05	T					23	
24												24	
25				0.04		0.50	0.80					25	
26		0.05				0.20						26	
27						0.50						27	
28					0.49							28	
29												29	
30								0.02				30	
31						0.48	T					31	
	0.00	0.00	0.60	0.04	1.57	1.62	2.23	0.51	1.40	1.33	0.00	0.30	

---LEGEND---

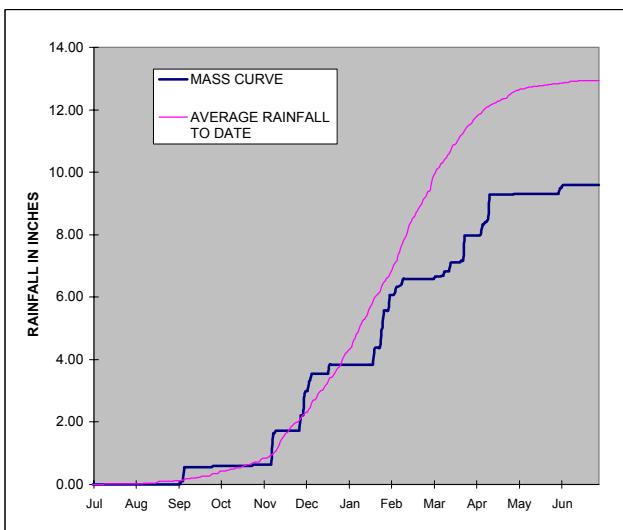
A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE

P - INCLUDED IN FOLLOWING TOTAL

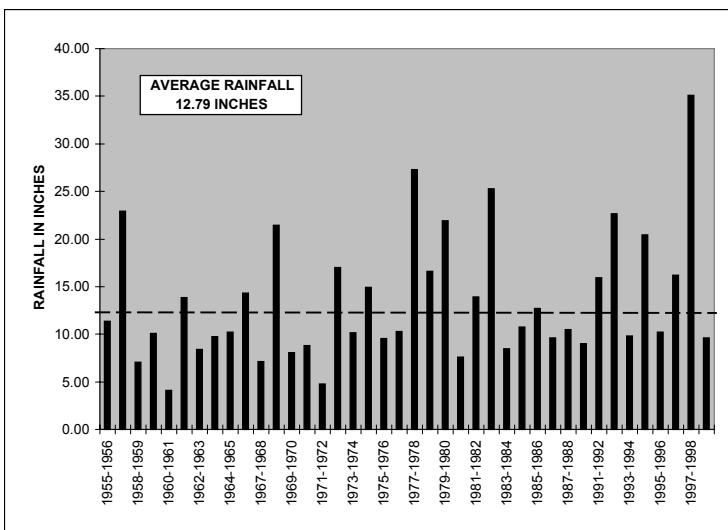
REMARKS _____

SEASON TOTAL 9.60 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL



* 1956-1957, 1966-1967, 1988-1989, 1989-1990 not included

1955-1956

1956-1957

1957-1958

1958-1959

1959-1960

1960-1961

1961-1962

1962-1963

1963-1964

1964-1965

1965-1966

1966-1967

1967-1968

1968-1969

1969-1970

1970-1971

1971-1972

1972-1973

1973-1974

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1980-1981

1981-1982

1982-1983

1983-1984

1984-1985

1985-1986

1986-1987

1987-1988

1988-1989

1989-1990

1990-1991

1991-1992

1992-1993

1993-1994

1994-1995

1995-1996

1996-1997

1997-1998

1998-1999

1999-2000

Table 10
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Santa Ana - Sta. 121

GAGE ELEVATION: 30'
 SEASON TOTAL: 7.55
 RECORDS: 1909 to Present
 MEAN: 13.15
 SEASON AS %: 57.4

DAY	LATITUDE 33-45-46												
	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1							0.45						1
2										0.04	2		
3											0.06	3	
4						0.07		T					4
5							0.20	0.18					5
6							0.24	0.13					6
7									0.58				7
8							1.05			0.11			8
9							0.03			0.06			9
10								0.14	0.02				10
11													11
12							0.05		0.07	0.89			12
13													13
14													14
15													15
16								0.31					16
17													17
18													18
19													19
20							0.15	0.21					20
21							0.05	0.06					21
22													22
23													23
24													24
25							0.46						25
26							0.02	0.60					26
27							0.51						27
28							0.34						28
29							0.05						29
30													30
31													31
	0.00	0.00	0.00	0.00	1.52	1.08	1.25	0.90	1.06	1.64	0.00	0.10	

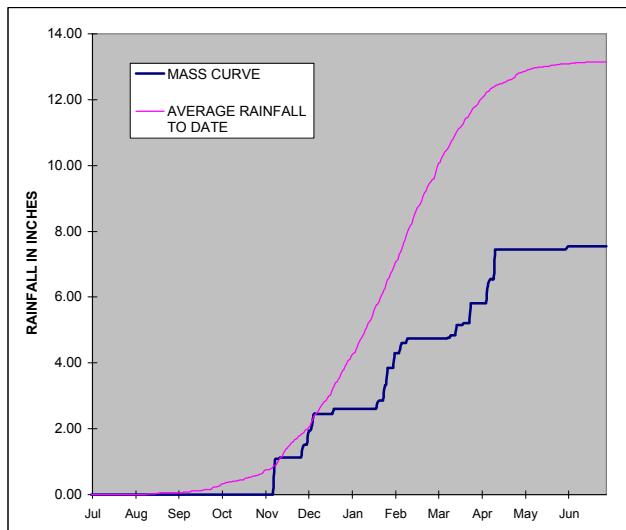
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 7.55 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

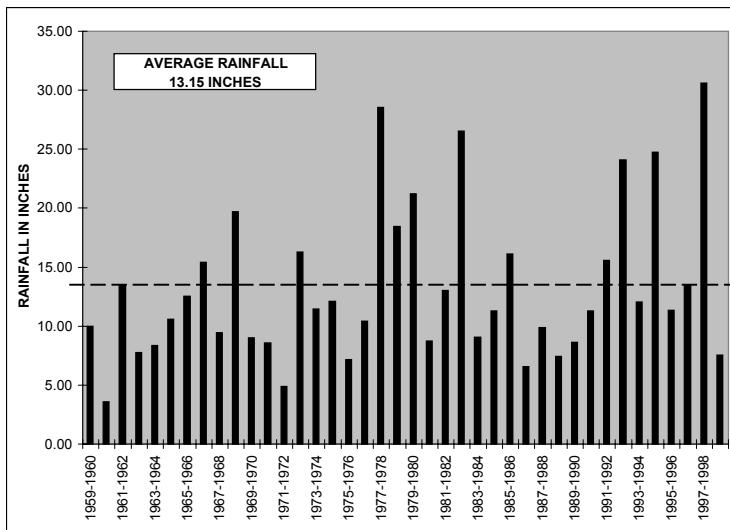


Table 11
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Yorba Reservoir - Sta.163

GAGE ELEVATION: 394' LATITUDE 33-52-19
 SEASON TOTAL: 7.26 LONGITUDE 117-48-37
 RECORDS: 1956 to Present 40 YEAR BASE PERIOD: * 1959-1999
 MEAN: * 14.54 MEAN: 14.46
 SEASON AS %: 49.9 SEASON AS %: 50.2

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1								0.22					1
2											0.15	2	
3													3
4													4
5							0.10	0.10					5
6								0.43					6
7									0.65				7
8							0.87		0.33				8
9													9
10								0.24					10
11													11
12								0.07	0.80				12
13													13
14													14
15													15
16								0.37					16
17													17
18													18
19													19
20							0.18	0.14					20
21									0.12				21
22													22
23													23
24									0.02				24
25								0.46					25
26								0.05	0.29				26
27								0.78					27
28								0.48					28
29								0.16					29
30													30
31													31
	0.00	0.00	0.00	0.00	1.51	0.96	1.43	0.56	0.85	1.80	0.00	0.15	

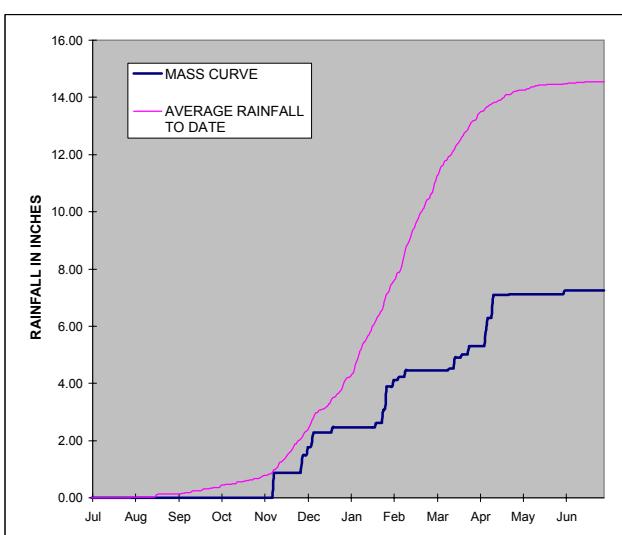
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 7.26 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

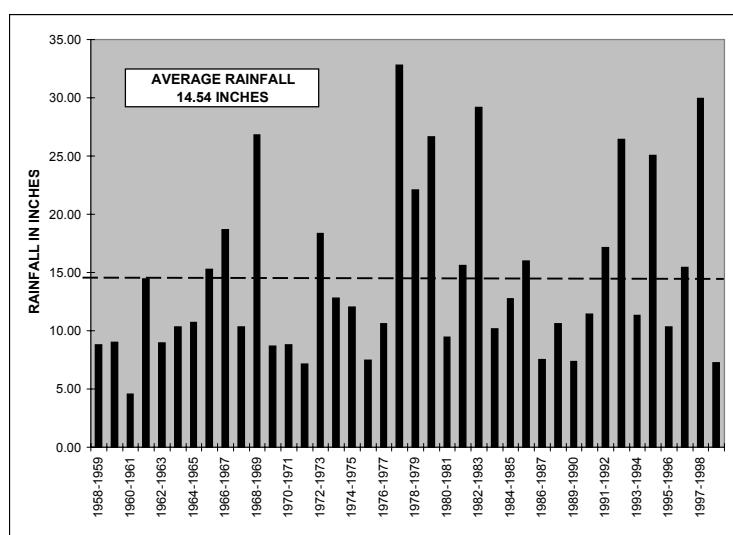


Table 12
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Costa Mesa - Sta. 165

GAGE ELEVATION:		53'	LATITUDE		33-40-07								
SEASON TOTAL:		6.65	LONGITUDE		117-53-35								
RECORDS:		1956 to Present	40 YEAR BASE PERIOD: *		1959-1999								
MEAN: *		12.42	MEAN:		12.36								
SEASON AS %:		53.5	SEASON AS %:		53.8								
DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1							0.39						1
2											0.10	2	
3			0.05										3
4							0.10						4
5							0.20	0.06					5
6							0.25	0.11					6
7								0.38					7
8							0.85						8
9										0.10			9
10								0.13	0.04				10
11													11
12							0.06		0.10	0.89			12
13													13
14													14
15													15
16							0.34						16
17													17
18													18
19													19
20							0.08	0.10					20
21							0.08	0.08					21
22													22
23													23
24													24
25							0.30						25
26							0.15	0.62					26
27							0.47						27
28							0.26						28
29							0.06						29
30													30
31													31
	0.00	0.00	0.05	0.00	1.23	0.93	1.10	0.69	1.18	1.37	0.00	0.10	

--LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 6.65 "

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1958-1959	0.00	0.00	0.05	0.00	0.05	0.01	1.39	3.39	0.02	0.41	0.00	0.00	5.32
1959-1960	0.00	0.00	0.00	0.00	0.08	2.09	2.40	2.70	0.35	1.64	0.03	0.00	9.29
1960-1961	0.00	0.00	0.00	0.00	2.44	0.12	0.67	0.01	0.43	0.04	0.00	0.02	3.73
1961-1962	0.00	0.00	0.02	0.14	1.07	1.85	2.27	6.59	1.13	0.00	0.51	0.07	13.65
1962-1963	0.00	0.00	0.00	0.05	0.03	0.04	0.00	3.05	2.00	1.50	0.00	0.18	6.85
1963-1964	0.00	0.00	2.02	0.40	2.94	0.01	1.06	0.12	0.95	0.47	0.02	0.00	7.99
1964-1965	0.00	0.00	0.40	0.04	1.06	1.50	0.53	0.26	0.93	6.11	0.00	0.00	10.83
1965-1966	0.04	0.00	0.39	0.00	6.11	3.58	1.32	1.28	0.14	0.00	0.18	0.00	13.04
1966-1967	0.00	0.00	0.03	0.05	2.05	5.72	2.67	0.02	1.43	2.83	0.00	0.01	14.81
1967-1968	0.00	0.00	0.24	0.00	2.49	1.66	0.75	0.26	1.90	0.60	0.06	0.00	7.96
1968-1969	0.05	0.00	0.18	0.33	1.31	8.46	8.01	0.53	0.69	0.06	0.01	0.00	19.63
1969-1970	0.01	0.00	0.00	0.00	1.98	0.06	1.44	1.09	2.20	0.00	0.00	0.01	6.79
1970-1971	0.00	0.00	0.00	0.00	2.41	2.68	1.00	0.48	0.22	0.50	0.71	0.07	8.07
1971-1972	0.00	0.00	0.13	0.11	3.91	0.04	0.10	0.01	0.12	0.03	0.06	0.00	4.51
1972-1973	0.00	0.18	0.14	0.22	3.00	1.50	3.53	4.26	1.91	0.00	0.00	0.00	14.74
1973-1974	0.00	0.00	0.00	0.02	1.38	0.30	4.12	0.00	2.92	0.25	0.11	0.02	9.12
1974-1975	0.00	0.00	0.00	0.33	0.15	3.84	0.54	1.46	2.63	2.57	0.09	0.00	11.61
1976-1977	0.00	0.00	2.45	0.14	0.86	0.50	2.92	0.97	0.85	0.00	1.83	0.00	10.52
1977-1978	0.00	1.69	0.00	0.00	0.02	2.15	9.17	5.95	6.95	1.40	0.00	0.00	27.33
1978-1979	0.00	0.02	1.75	0.00	3.05	1.69	4.62	3.52	5.09	0.00	0.00	0.00	19.74
1979-1980	0.00	0.00	0.00	0.42	0.85	0.26	7.59	6.99	3.41	0.33	0.22	0.00	20.07
1980-1981	0.00	0.00	0.00	0.00	0.00	0.64	2.33	1.27	3.62	0.22	0.58	0.01	8.67
1981-1982	0.00	0.00	0.00	1.17	2.29	0.73	2.63	0.78	4.56	0.92	0.10	0.00	13.18
1982-1983	0.00	0.00	0.39	0.13	3.28	0.95	3.39	4.33	11.40	2.77	0.41	0.00	27.05
1983-1984	0.00	0.11	0.30	1.20	2.85	1.94	0.45	0.00	0.13	0.96	0.00	0.00	7.94
1984-1985	0.47	0.08	0.19	0.13	1.95	4.89	0.41	1.93	0.53	0.00	0.07	0.00	10.65
1985-1986	0.00	0.00	0.26	0.08	3.40	0.42	1.05	4.81	2.97	0.81	0.00	0.00	13.80
1986-1987	0.09	0.00	0.20	0.72	0.54	0.54	1.41	1.06	2.05	0.19	0.00	0.00	6.80
1987-1988	0.00	0.19	0.08	1.15	3.23	1.75	1.63	0.73	0.27	2.21	0.01	0.00	11.25
1988-1989	0.00	0.00	0.13	0.00	1.26	3.21	0.44	1.30	0.86	0.00	0.05	0.00	7.25
1989-1990	0.00	0.00	0.32	0.33	0.15	0.00	1.87	2.73	0.26	0.67	0.63	0.01	6.97
1990-1991	0.00	0.04	0.00	0.00	0.48	0.08	1.18	2.00	8.27	0.02	0.00	0.00	12.07
1991-1992	0.00	0.00	0.10	0.24	0.07	1.13	0.68	4.89	4.86	0.34	0.00	0.00	12.31
1992-1993	0.08	0.00	0.00	0.81	0.00	5.03	10.06	4.53	1.60	0.00	0.00	0.00	23.61
1993-1994	0.00	0.00	0.08	0.08	0.48	0.75	0.69	4.49	1.82	0.75	0.11	0.00	9.17
1994-1995	0.00	0.00	0.00	0.05	0.82	1.03	10.87	1.07	5.35	0.89	0.20	0.49	20.77
1995-1996	0.06	0.00	0.00	0.00	0.01	1.34	1.92	4.17	1.19	0.44	0.00	0.00	9.13
1996-1997	0.00	0.00	0.00	0.93	2.36	4.01	4.86	0.11	0.00	0.00	0.00	0.00	12.27
1997-1998	0.00	0.00	0.62	0.00	2.43	6.68	1.88	12.57	2.17	1.06	1.70	0.00	29.11
1998-1999	0.00	0.00	0.05	1.23	0.93	1.10	0.69	1.18	1.37	0.00	0.10	0.00	6.65
Totals	0.80	2.31	10.13	9.14	59.29	70.83	105.34	103.97	89.09	33.08	7.71	2.56	494.25
Average	0.02	0.06	0.25	0.23	1.48	1.77	2.63	2.60	2.23	0.83	0.19	0.06	12.36
Max	0.47	1.69	2.45	1.20	6.11	6.68	10.87	12.57	11.40	6.11	1.83	1.50	29.11

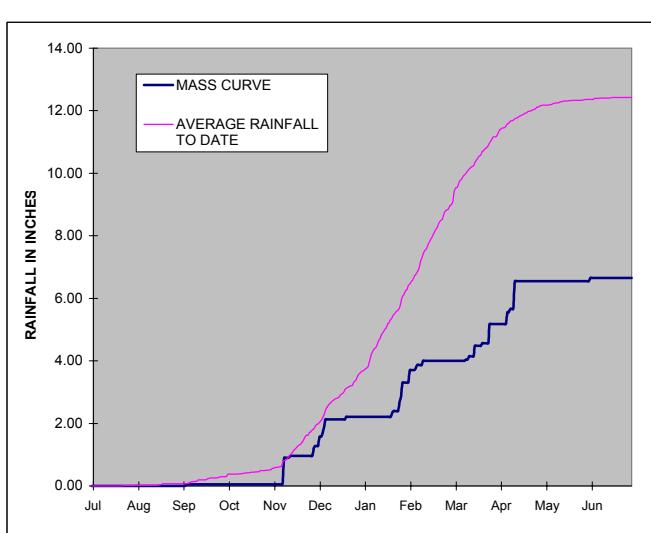
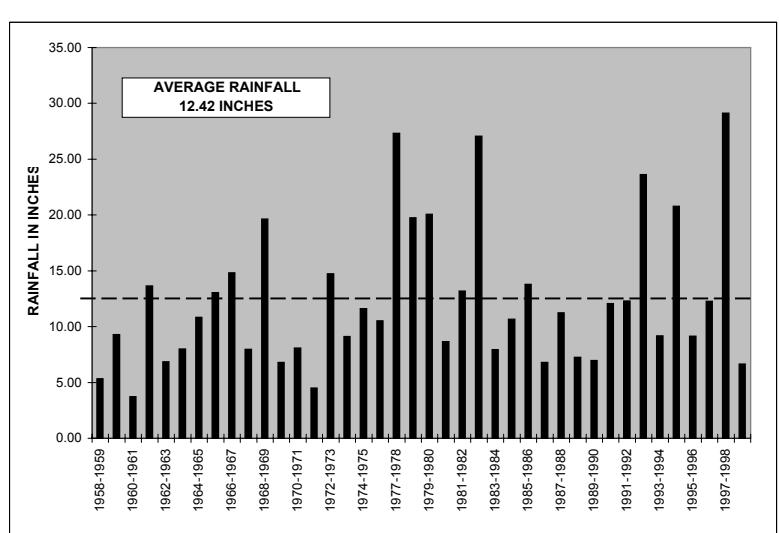


Table 13
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Corona Del Mar - Sta. 169

GAGE ELEVATION: 300' LATITUDE 33-36-35
 SEASON TOTAL: 6.70 LONGITUDE 117-51-27
 RECORDS: 1960 to Present 35 YEAR BASE PERIOD: * 1964-1999
 MEAN: * 12.73 MEAN: 13.46
 SEASON AS %: 52.6 SEASON AS %: 49.8

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1							0.30						1
2											0.17	2	
3													3
4			0.24										4
5			0.04			0.17	0.03						5
6						0.15	0.04						6
7								0.11	0.37				7
8							0.63						8
9									0.05				9
10								0.20	0.09				10
11													11
12					0.03			0.12	0.88				12
13													13
14													14
15													15
16							0.28						16
17													17
18													18
19													19
20						0.06	0.11						20
21							0.08	0.03	0.06				21
22													22
23													23
24													24
25						0.03		0.31					25
26							0.22	0.61					26
27								0.43					27
28								0.20					28
29								0.06					29
30													30
31													31
	0.00	0.00	0.28	0.03	0.92	1.06	1.10	0.57	1.27	1.30	0.00	0.17	

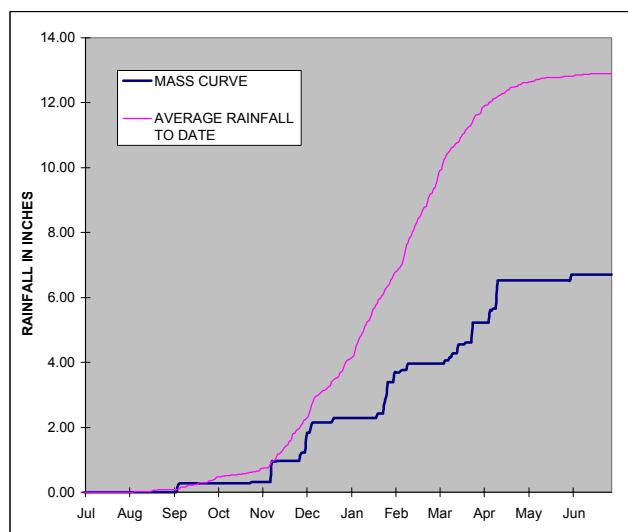
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 6.70 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

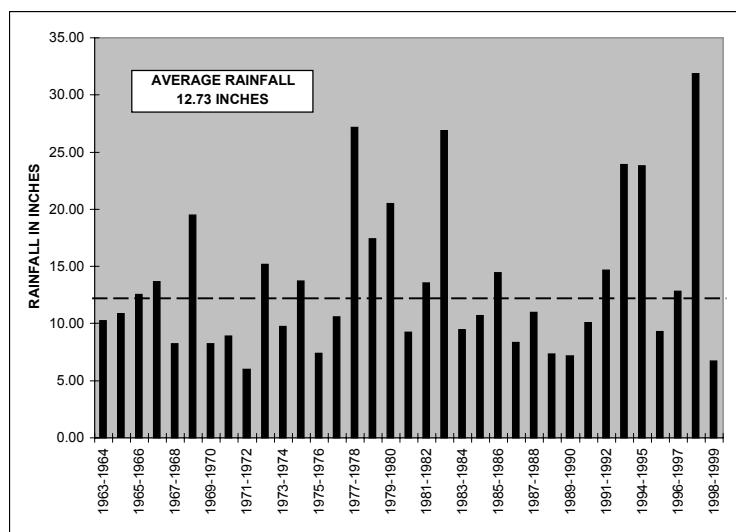


Table 14
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Los Alamitos - Sta. 170

GAGE ELEVATION: 7'
 SEASON TOTAL: 7.55
 RECORDS: 1959 to Present
 MEAN: * 10.34
 SEASON AS %: 73.0

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1								0.33					1
2											0.34		2
3													3
4			0.05										4
5							0.23	0.34					5
6				0.15									6
7									0.61				7
8					0.58				0.11				8
9													9
10							0.12						10
11													11
12								0.09	1.43				12
13													13
14													14
15								0.35					15
16								0.32					16
17													17
18													18
19													19
20				0.08	0.09		0.09						20
21				0.04	0.09		0.02						21
22													22
23													23
24									0.06				24
25							0.37						25
26							0.10	0.50					26
27							0.44						27
28							0.19						28
29													29
30													30
31													31
	0.00	0.00	0.05	0.15	0.77	0.78	1.09	0.79	1.37	2.15	0.06	0.34	

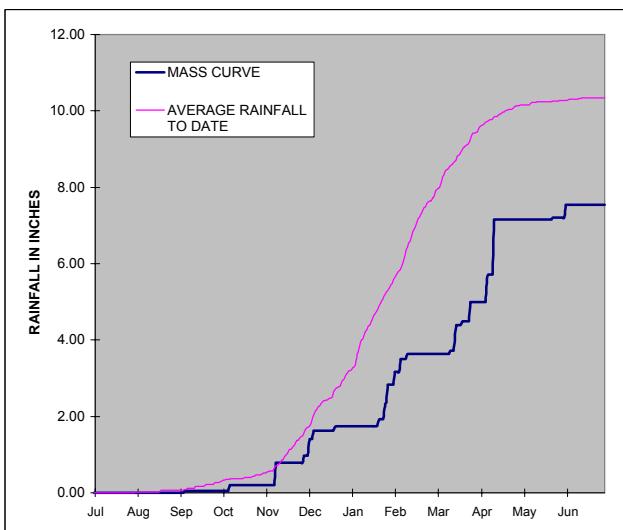
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A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS Dec 20 & 21, Jan 20 & 21 totals taken from ALERT 8132

SEASON TOTAL 7.55 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

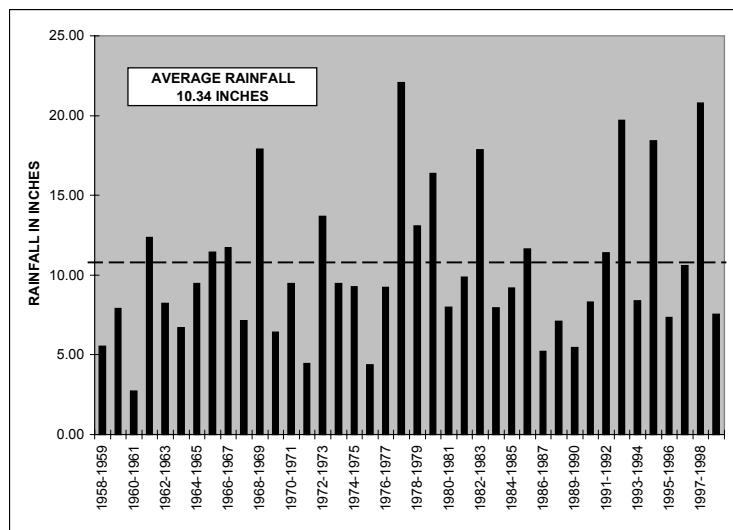


Table 15
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Villa Park Dam - Sta. 173

GAGE ELEVATION: 566' LATITUDE 33-49-02
 SEASON TOTAL: 8.05 LONGITUDE 117-46-07
 RECORDS: 1962 to Present 35 YEAR BASE PERIOD: 1965-1999
 MEAN: 15.50 MEAN: 15.85
 SEASON AS %: 51.9 SEASON AS %: 50.8

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY	
1							0.40			0.01			1	
2								0.27			0.22	2		
3											0.06	3		
4							0.12		0.07			0.02	4	
5								0.15	0.21				5	
6							0.36	0.17					6	
7									0.02	0.62			7	
8							0.71			0.11			8	
9							0.10			0.09			9	
10								0.29	0.05				10	
11							0.06						11	
12							0.01		0.06	0.67			12	
13													13	
14													14	
15													15	
16							0.32						16	
17													17	
18													18	
19													19	
20							0.17	0.12	0.04				20	
21								0.07	0.11				21	
22													22	
23													23	
24									0.01				24	
25							0.45						25	
26							0.04	0.41					26	
27							0.79						27	
28							0.42						28	
29							0.20						29	
30													30	
31							0.05						31	
	0.00	0.00	0.00	0.00	1.50	1.07	1.52	1.07	1.08	1.50	0.01	0.30		

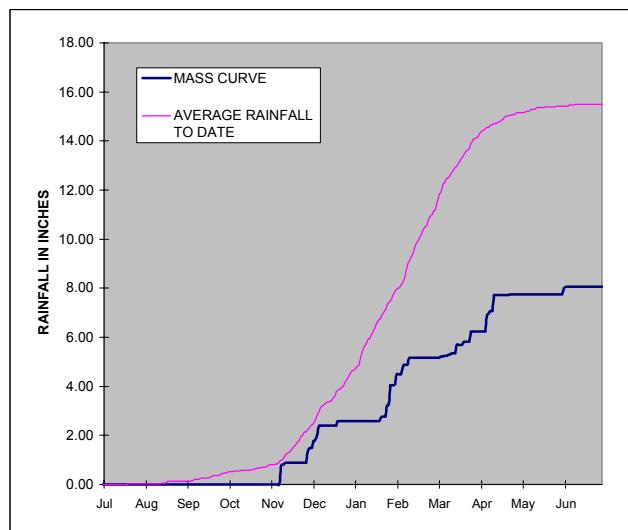
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A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 8.05 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

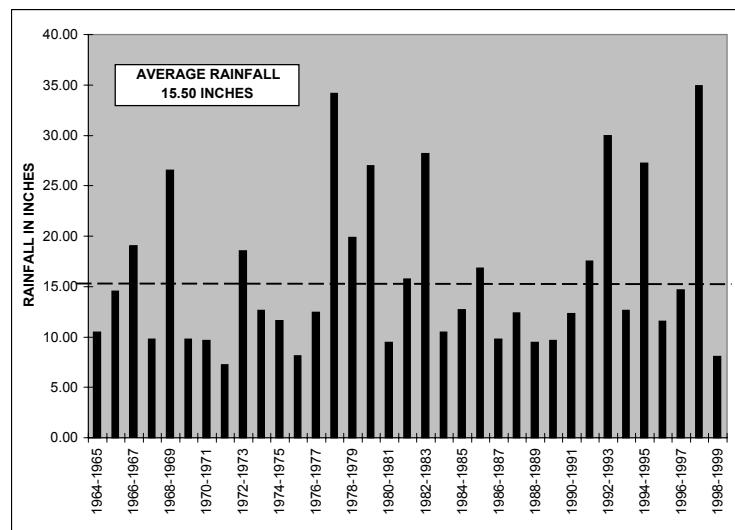


Table 16
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 El Toro - Sta. 176

GAGE ELEVATION: 445' LATITUDE 33-37-39
 SEASON TOTAL: 7.52 LONGITUDE 117-41-26
 RECORDS: 1965 to Present 35 YEAR BASE PERIOD: 1965-1999
 MEAN: 15.41 MEAN:
 SEASON AS %: 48.8 SEASON AS %: 48.8

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1								0.19					1
2											0.15	2	
3													3
4								0.14	0.04				4
5								0.24	0.21				5
6								0.20					6
7									0.07	0.38			7
8									0.62		0.08		8
9									0.10				9
10									0.13				10
11													11
12										0.65			12
13													13
14													14
15													15
16								0.25					16
17													17
18													18
19													19
20								0.24	0.12				20
21									0.12	0.05			21
22													22
23													23
24													24
25									0.47				25
26								0.18	0.55				26
27								0.63					27
28									0.81				28
29									0.18				29
30													30
31									0.11				31
	0.00	0.00	0.00	0.00	1.71	1.29	1.63	0.53	1.06	1.15	0.00	0.15	

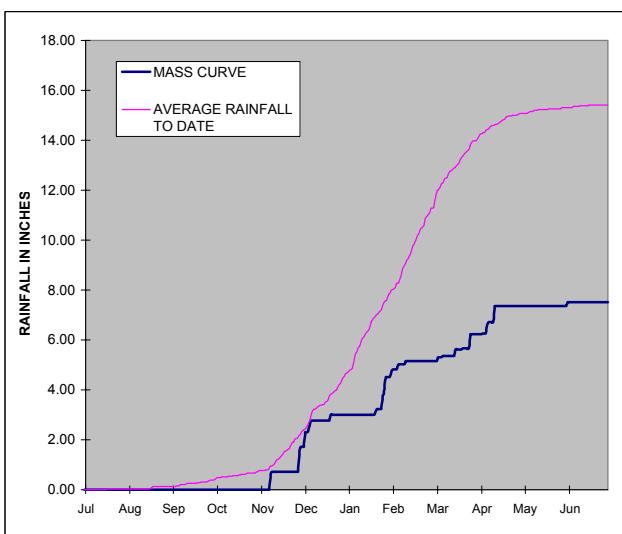
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 7.52 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

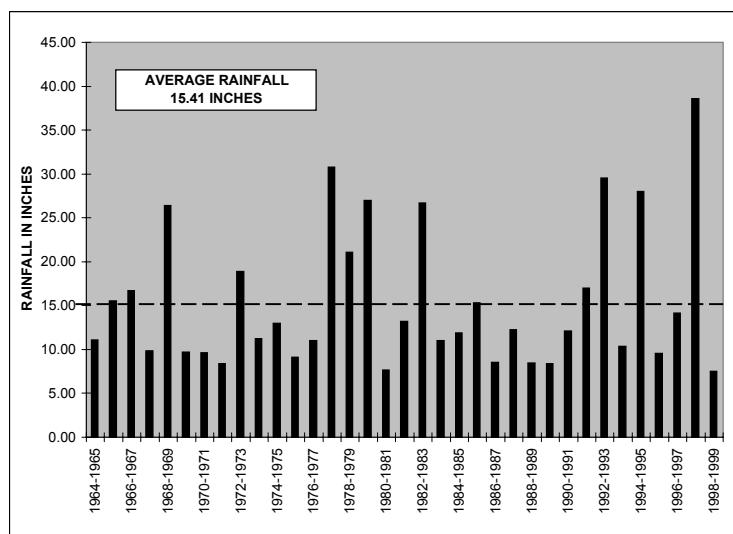


Table 17
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Palisades Reservoir - Sta. 186

GAGE ELEVATION: 360 LATITUDE 33-27-46
 SEASON TOTAL: 7.99 LONGITUDE 117-39-02
 RECORDS: 1966 to Present 30 YEAR BASE PERIOD: * 1968-1999
 MEAN: * 13.59 MEAN: 13.60
 SEASON AS %: 58.8 SEASON AS %: 58.8

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1								0.21					1
2												0.13	2
3			0.15					0.09					3
4			0.45			0.04		0.29	0.04			0.09	4
5													5
6								0.48					6
7									0.24				7
8					0.96								8
9					0.08								9
10								0.26					10
11													11
12								1.02					12
13													13
14													14
15								0.33					15
16													16
17													17
18													18
19													19
20								0.28	0.19	0.05			20
21								0.13					21
22													22
23									0.02				23
24													24
25								0.41	0.59				25
26								0.14					26
27								0.17					27
28								0.57					28
29													29
30													30
31								0.21					31
	0.00	0.00	0.60	0.00	1.61	1.17	1.25	0.85	1.01	1.26	0.02	0.22	

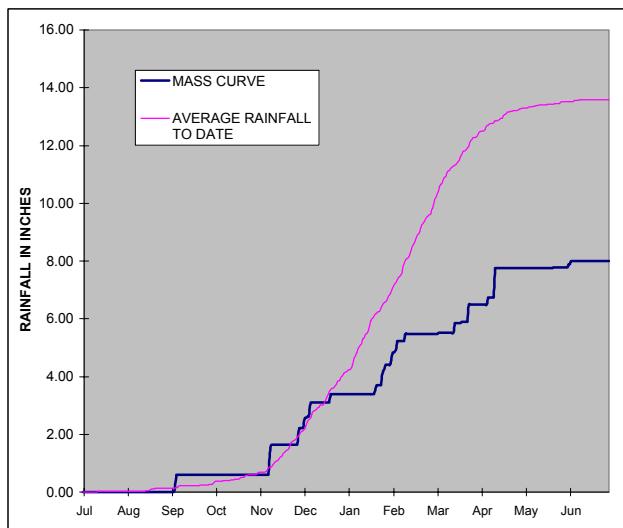
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 7.99 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

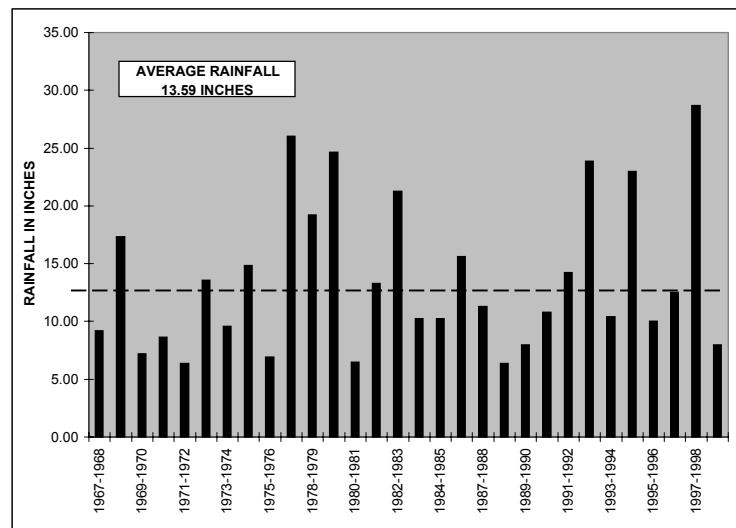


Table 18
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Santiago Peak - Sta. 208

GAGE ELEVATION: 5638' LATITUDE 33-42-06
 SEASON TOTAL: 26.30 LONGITUDE 117-32-01
 RECORDS: 1950 to Present 40 YEAR BASE PERIOD: 1960-1999
 MEAN: 35.02 MEAN: 36.37
 SEASON AS %: 75.1 SEASON AS %: 72.3

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1		0.08					0.48		0.08				1
2				0.47		0.07	0.16		0.32	2			
3		0.55					0.31		0.47	3			
4		0.24		0.63			0.47	0.08	0.23	0.24	4		
5							1.34	0.08	0.08	0.15	5		
6							0.79	0.48					6
7								0.39					7
8			2.37				0.08	0.48					8
9			1.02					1.10					9
10				0.08		1.65	0.08						10
11			0.08										11
12		0.55				0.24	0.31						12
13							0.32						13
14													14
15													15
16							0.31						16
17							0.16						17
18								1.57					18
19													19
20				1.73	0.55								20
21			0.08	0.08	0.63	0.23							21
22													22
23							0.16						23
24							1.57						24
25			0.31		0.16								25
26							0.15	0.16					26
27													27
28				0.63	0.71								28
29				1.42	0.47								29
30					0.08		0.16						30
31													31
	0.00	0.00	0.87	0.39	6.07	3.78	2.75	4.02	1.73	5.20	0.31	1.18	

---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE

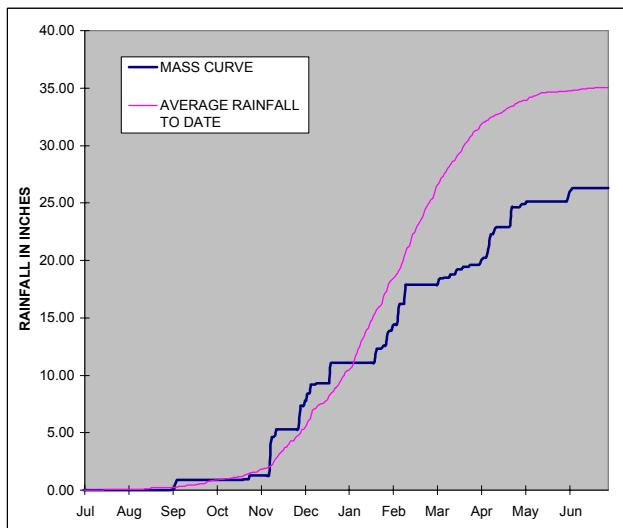
P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

NOTE Prior to 1996 Season Totals taken from NWS Gage #156

SEASON TOTAL 26.30 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

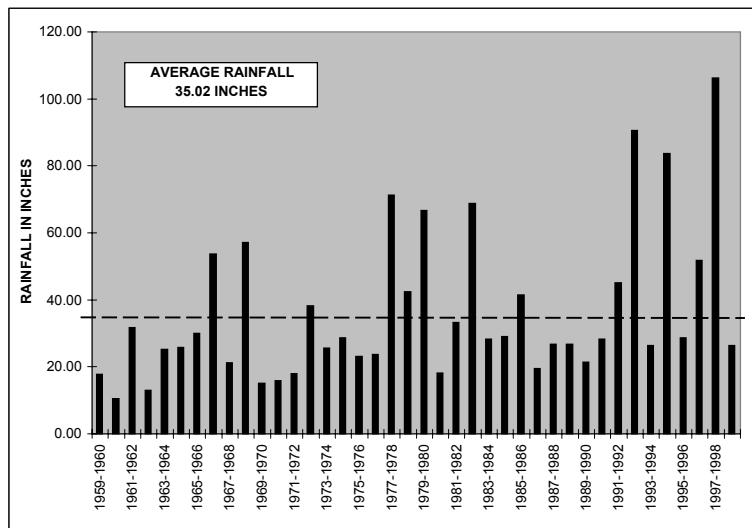


Table 19
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Trabuco Forestry - Sta. 206

GAGE ELEVATION: 970' LATITUDE 33-39-15
 SEASON TOTAL: 10.27 LONGITUDE 117-35-34
 RECORDS: 1970 to Present 25 YEAR BASE PERIOD: 1975-1999
 MEAN: * 20.80 MEAN: 21.46
 SEASON AS %: 49.4 SEASON AS %: 47.9

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1											0.30	1	
2											0.05	2	
3											0.07	3	
4											0.15	4	
5											1.01	30	5
6											0.07	6	
7											0.01	0.04	7
8											1.02		8
9											0.42	0.01	9
10													10
11											0.18	0.09	0.84
12													12
13													13
14													14
15											0.31		15
16													16
17													17
18													18
19											0.38		19
20											0.60		20
21													21
22											0.04		22
23											0.07		23
24													24
25											0.77		25
26											0.55		26
27													27
28											0.85		28
29													29
30											0.04		30
31											0.20	1.01	31
	0.00	0.20	0.00	0.00	2.05	1.39	2.38	0.79	1.12	1.92	0.00	0.42	

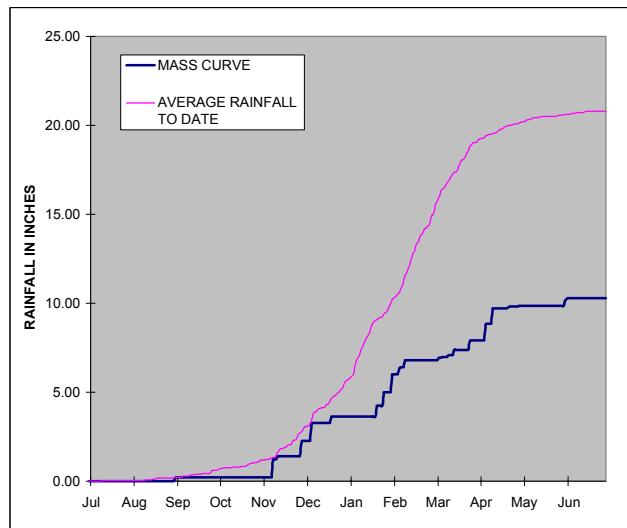
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 10.27 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

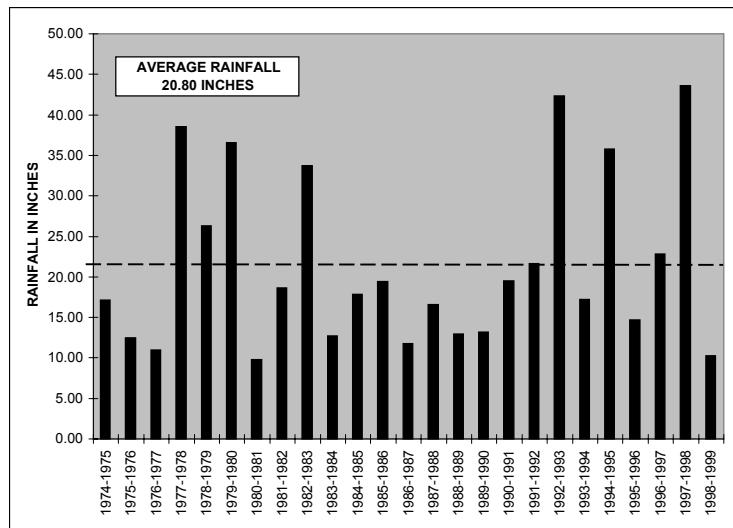


Table 20
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Sulphur Creek Dam - Sta. 216

GAGE ELEVATION: 200' LATITUDE 33-32-59
 SEASON TOTAL: 8.82 LONGITUDE 117-42-20
 RECORDS: 1975 to Present 25 YEAR BASE PERIOD: 1975-1999
 MEAN: 14.96 MEAN:
 SEASON AS %: 59.0 SEASON AS %: 59.0

DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1								0.34					1
2											0.40	2	
3		0.07											3
4		0.13		0.05									4
5				0.23	0.24								5
6				0.37									6
7							0.08	0.52					7
8			0.66										8
9			0.20				0.08						9
10				0.20									10
11													11
12						0.18	0.92						12
13													13
14													14
15													15
16						0.30							16
17													17
18													18
19													19
20				0.27	0.17								20
21					0.06								21
22													22
23													23
24													24
25				0.34									25
26					0.20	0.48							26
27					0.61								27
28				0.77									28
29				0.07									29
30													30
31													31
	0.00	0.00	0.20	0.00	1.70	1.80	1.38	0.78	1.04	1.52	0.00	0.40	

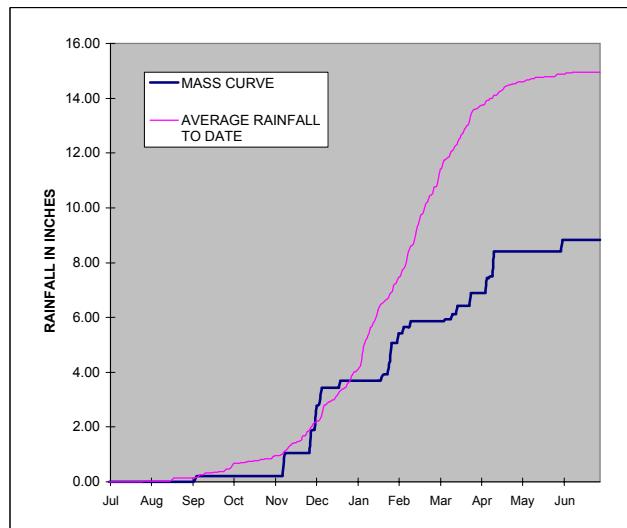
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 8.82 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

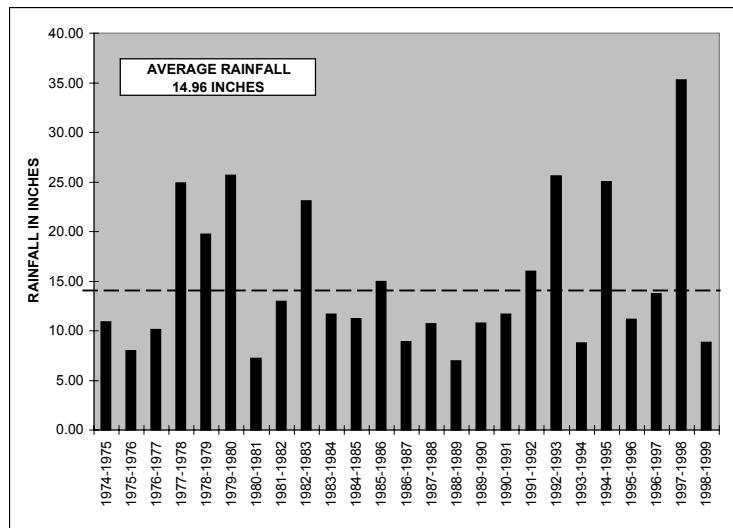


Table 21
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Orange - Hardacre - Sta. 222

GAGE ELEVATION: 298' LATITUDE 33-48-53
 SEASON TOTAL: 7.90 LONGITUDE 117-49-20
 RECORDS: 1929 to Present 40 YEAR BASE PERIOD: 1960-1999
 MEAN: 14.19 MEAN: 14.10
 SEASON AS %: 55.7 SEASON AS %: 56.0

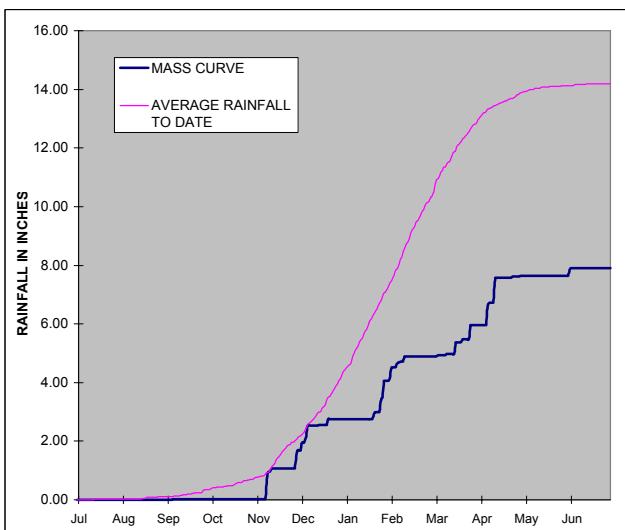
DAY	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	DAY
1								0.40					1
2											0.19	2	
3			T								0.06	3	
4						0.12		0.03					4
5			0.02			0.15		0.12					5
6						0.32		0.05					6
7							T	0.65					7
8						0.85		0.02		0.12			8
9						0.09			T				9
10							0.19	0.05					10
11						0.08							11
12						0.03			0.86				12
13													13
14						0.02							14
15													15
16							0.40						16
17													17
18													18
19													19
20						0.21	0.15	0.02					20
21							0.08	0.08					21
22													22
23								0.02					23
24								0.03					24
25						0.46							25
26						0.04	0.47						26
27						0.57							27
28						0.41							28
29						0.20							29
30								0.02					30
31							0.06	T					31
	0.00	0.00	0.02	0.00	1.66	1.08	1.36	0.78	1.05	1.68	0.02	0.25	

---LEGEND---
 A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

REMARKS _____

SEASON TOTAL 7.90 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL

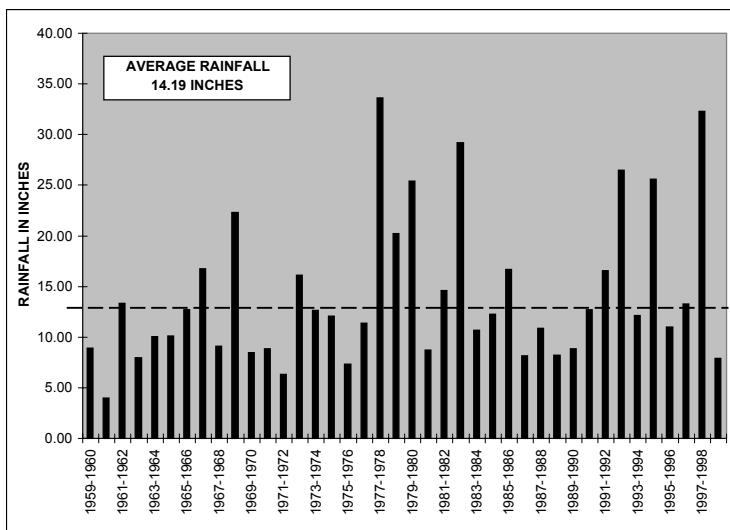


Table 22
ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT
 Precipitation Summary 1998-1999
 Garden Grove Fire - Sta. 229

GAGE ELEVATION: 80'
 SEASON TOTAL: 8.14
 RECORDS: 1986 to Present
 MEAN: 13.10
 SEASON AS %: 62.2

DAY	LATITUDE 33-47-26 LONGITUDE 117-58-03												DAY
	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1							0.26						1
2						0.24	0.07					0.25	2
3													3
4													4
5						0.06	0.33						5
6						0.31	0.12						6
7								0.55					7
8						1.13		0.10					8
9													9
10							0.11	0.06					10
11						0.04							11
12								0.07	1.35				12
13													13
14													14
15						0.28							15
16							0.36						16
17													17
18													18
19													19
20						0.15	0.12	0.08					20
21							0.08	0.06					21
22													22
23													23
24													24
25						0.48							25
26							0.06	0.50					26
27							0.36						27
28						0.44							28
29						0.12							29
30													30
31													31
	0.00	0.00	0.00	0.00	1.73	0.76	1.10	0.89	1.41	2.00	0.00	0.25	

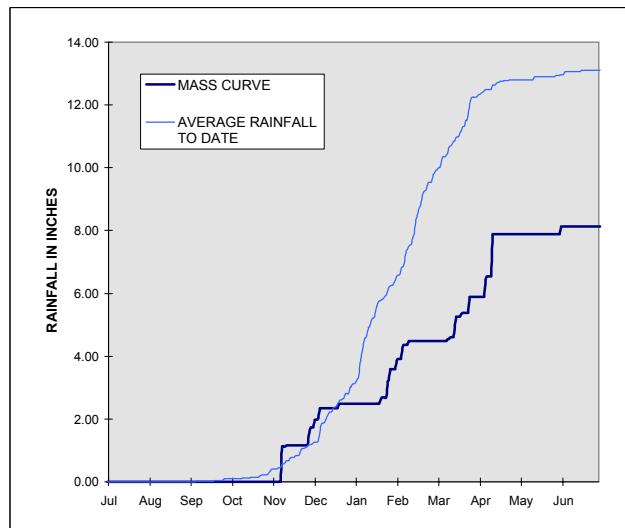
---LEGEND---

A - ESTIMATED C - INCOMPLETE NR - NO RECORD
 B - PARTIALLY ESTIMATED D - DATE UNCERTAIN T - TRACE
 P - INCLUDED IN FOLLOWING TOTAL

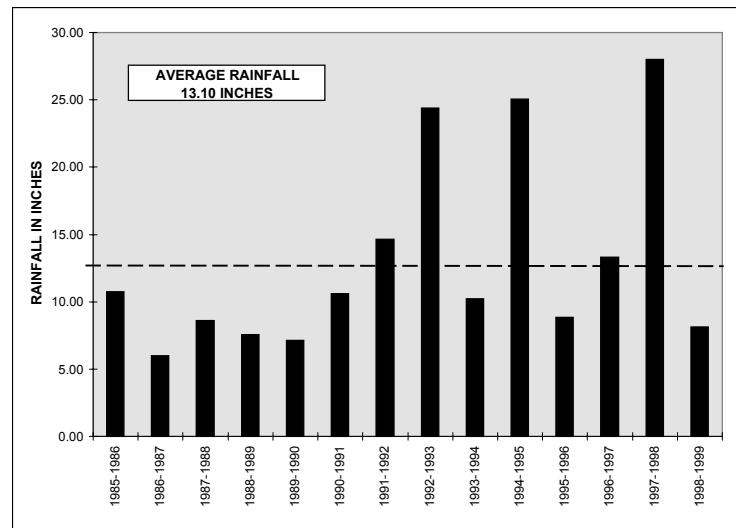
REMARKS _____

SEASON TOTAL 8.14 "

MASS CURVE VS. AVERAGE RAINFALL TO DATE



SEASON TOTALS vs. AVERAGE RAINFALL



AVERAGE RAINFALL
 13.10 INCHES

Table 23

Public Facilities and Resources Department
SHORT - DURATION INTENSITY DATA
FOR SELECTED RAINFALL STATIONS
1998-1999
(MAXIMUM PRECIPITATION IN INCHES)

NO.	STATION NAME	DURATION								
		10 MINS	15 MINS	30 MINS	1 HR	2 HR	3 HR	6 HRS	12 HR	24 HR
203	Portola Park	0.24 Apr-7	0.24 Apr-7	0.28 Apr-7	0.40 Nov-8	0.59 Nov-8	0.87 Nov-8	0.87 Nov-8	0.91 Nov-8	0.91 Nov-8
207	EI Toro	0.20 Sep-3	0.27 Nov-28	0.39 Nov-28	0.59 Nov-28	0.67 Nov-28	0.67 Nov-28	0.67 Nov-28	0.79 Nov-28	0.87 Nov-28
208	Santiago Peak	0.24 Nov-8	0.32 Nov-8	0.55 Nov-8	0.95 Nov-8	1.42 Nov-8	2.05 Nov-8	2.45 Nov-8	3.15 Nov-8	3.31 Nov-8
215	San Juan Capistrano	0.16 Sep-3	0.20 Sep-3	0.27 Nov-8	0.43 Nov-8	0.59 Nov-8	0.75 Nov-8	0.75 Nov-8	0.86 Apr-11	0.86 Apr-11
217	Lambert Reservoir	0.12 Dec-1	0.20 Dec-1	0.31 Dec-1	0.39 Dec-1	0.47 Dec-1	0.75 Dec-1	0.79 Dec-1	0.79 Dec-1	0.79 Dec-1
219	Santa Ana Engineering	0.16 Jan-31	0.20 Jan-31	0.27 Jan-31	0.31 Jan-31	0.75 Nov-8	0.98 Nov-8	1.02 Nov-8	1.06 Nov-8	1.06 Nov-8
223	Katella Yard	0.12 Nov-8	0.16 Nov-8	0.28 Nov-8	0.43 Nov-8	0.59 Nov-8	0.86 Nov-8	0.90 Nov-8	0.98 Nov-8	0.98 Nov-8
226	Santiago Crk @ Santa Ana	0.16 Jan-31	0.20 Jan-31	0.28 Nov-8	0.51 Nov-8	0.71 Nov-8	0.98 Nov-8	1.02 Nov-8	1.06 Nov-8	1.06 Nov-8
239	Westminster Channel	0.16 Jan-31	0.19 Nov-8	0.31 Nov-8	0.51 Nov-8	0.74 Nov-8	0.94 Nov-8	0.98 Nov-8	0.98 Nov-8	0.98 Nov-8
248	Coto De Caza	0.19 Nov-28	0.23 Nov-28	0.35 Nov-28	0.51 Nov-28	0.55 Nov-28	0.67 Nov-28	0.67 Nov-28	0.91 Nov-28	0.95 Nov-28
256	Lower Silverado Cyn	0.19 Nov-11	0.23 Nov-11	0.31 Nov-11	0.43 Nov-11	0.47 Nov-11	0.59 Nov-11	0.63 Nov-11	0.75 Nov-11	0.99 Jan-9
261	East Garden Grove Wintersburg	0.24 Jan-31	0.28 Jan-31	0.32 Jan-31	0.44 Nov-8	0.59 Nov-8	0.86 Apr-11	1.06 Apr-11	1.30 Apr-11	1.30 Apr-11
263	Corona Del Mar	0.12 Mar-15	0.16 Mar-15	0.16 Mar-25	0.24 Mar-25	0.35 Mar-25	0.51 Mar-25	0.59 Mar-25	0.79 Apr-11	0.79 Apr-11
265	Brea	0.08 Nov-8	0.12 Nov-8	0.24 Nov-8	0.35 Nov-8	0.51 Nov-8	0.78 Nov-8	0.78 Nov-8	1.03 Apr-11	1.03 Apr-11

Table 23
(CONTINUED)

Public Facilities and Resources Department
**SHORT - DURATION INTENSITY DATA
FOR SELECTED RAINFALL STATIONS**
1998-1999
(MAXIMUM PRECIPITATION IN INCHES)

NO.	STATION NAME	DURATION								
		10 MINS	15 MINS	30 MINS	1 HR	2 HR	3 HR	6 HRS	12 HR	24 HR
283	Peters Canyon Wash	0.12 Dec-3	0.20 Dec-3	0.24 Nov-8	0.40 Nov-8	0.60 Nov-8	0.83 Nov-8	0.83 Nov-8	0.83 Nov-8	0.83 Nov-8
294	Anaheim Agriculture	0.12 Nov-8	0.16 Nov-8	0.24 Nov-8	0.40 Nov-8	0.56 Nov-8	0.83 Nov-8	0.83 Nov-8	1.03 Apr-11	1.03 Apr-11
1100	Lacouaque	0.12 Nov-28	0.15 Nov-28	0.24 Nov-28	0.40 Nov-28	0.52 Nov-8	0.67 Nov-8	0.74 Nov-8	0.78 Nov-8	0.86 Nov-8
1111	Santa Ana Delhi	0.16 Jan-26	0.24 Jan-26	0.36 Jan-26	0.36 Jan-26	0.47 Nov-8	0.75 Nov-8	0.78 Nov-8	0.91 Apr-11	0.91 Apr-11
1117	Anaheim Barber City	0.12 Mar-15	0.19 Mar-15	0.31 Mar-15	0.43 Mar-15	0.63 Nov-8	0.79 Apr-11	1.06 Apr-11	1.26 Apr-11	1.26 Apr-11
1120	Laguna Beach	0.12 Nov-8	0.16 Nov-8	0.24 Nov-8	0.32 Nov-8	0.52 Nov-8	0.79 Nov-8	0.79 Nov-8	0.83 Nov-8	0.90 Nov-8
1130	Laguna Beach Audubon	0.16 Jan-31	0.20 Jan-31	0.28 Jan-31	0.43 Nov-8	0.67 Nov-8	0.90 Nov-8	0.90 Nov-8	0.90 Nov-8	0.94 Nov-8
1140	Fullerton Airport	0.16 Jan-26	0.19 Jan-26	0.23 Jan-26	0.36 Nov-8	0.56 Nov-8	0.83 Nov-8	0.87 Nov-8	1.07 Apr-11	1.07 Apr-11
1141	Upper Aliso Creek	0.20 Nov-28	0.27 Nov-28	0.39 Nov-28	0.55 Nov-28	0.59 Nov-28	0.59 Nov-28	0.59 Nov-28	0.75 Nov-28	0.83 Jan-26
1145	Pico Basin San Clemente	0.16 Nov-28	0.24 Nov-28	0.32 Nov-28	0.51 Nov-8	0.67 Nov-8	0.75 Nov-8	0.79 Nov-8	0.87 Nov-8	0.87 Nov-8
1150	Costa Mesa	0.16 Jan-31	0.20 Jan-31	0.24 Jan-31	0.32 Nov-8	0.48 Nov-8	0.75 Nov-8	0.75 Nov-8	0.82 Apr-11	0.82 Apr-11
1155	Segunda Desheca	0.20 Nov-28	0.28 Nov-28	0.32 Nov-28	0.51 Nov-8	0.67 Nov-8	0.78 Nov-8	0.79 Dec-4	0.90 Apr-11	0.90 Apr-11
1160	El Cariso Guard	0.08 Nov-8	0.12 Nov-8	0.2 Nov-8	0.32 Nov-8	0.48 Nov-8	0.75 Nov-8	0.83 Nov-8	0.98 Nov-8	0.98 Nov-8
1170	Upper Sliverado	0.12 Nov-28	0.16 Nov-28	0.24 Nov-28	0.40 Nov-28	0.63 Nov-28	0.90 Jan-26	0.94 Jan-26	1.26 Apr-11	1.46 Jan-26

Table 24

Public Facilities and Resources Department
**LONG - DURATION INTENSITY DATA
FOR SELECTED RAINFALL STATIONS**
1998-1999
(MAXIMUM PRECIPITATION IN INCHES)

STATION		DURATION IN DAYS										
		2	3	4	5	6	8	10	15	20	30	60
203	Portola Park	0.91 Nov-7	0.91 Nov-6	0.94 Nov-8	1.14 Apr-7	1.41 Apr-6	1.57 Apr-5	1.57 Apr-3	1.57 Mar-29	2.17 Mar-24	2.48 Mar-14	2.56 Feb-12
207	El Toro	0.87 Nov-27	1.30 Jan-24	1.30 Jan-23	1.34 Nov-27	1.38 Nov-27	1.65 Jan-24	1.85 Nov-26	1.89 Jan-17	2.13 Jan-17	2.44 Nov-6	3.00 Nov-27
208	Santiago Peak	3.39 Nov-7	3.39 Nov-6	3.47 Nov-7	4.02 Nov-7	4.02 Nov-6	4.02 Nov-4	4.02 Nov-2	5.28 Jan-26	5.59 Jan-21	7.96 Nov-6	10.16 Oct-22
215	San Juan Capistrano	0.87 Nov-7	0.90 Jan-24	0.90 Jan-23	1.38 Dec-1	1.38 Nov-30	1.62 Nov-28	2.01 Nov-26	2.01 Nov-21	2.01 Nov-16	2.92 Nov-6	3.23 Oct-22
217	Lambert Reservoir	1.26 Jan-25	1.30 Jan-25	1.30 Nov-28	1.30 Nov-27	1.66 Dec-1	1.73 Nov-28	2.17 Nov-27	2.17 Nov-22	2.17 Nov-17	2.76 Nov-7	3.90 Nov-28
219	Santa Ana Engineering	1.06 Nov-7	1.06 Nov-6	1.10 Nov-8	1.22 Apr-7	1.54 Apr-6	1.69 Apr-5	1.69 Apr-3	1.69 Mar-29	2.24 Mar-24	2.55 Mar-14	2.64 Jan-25
223	Katella Yard	0.98 Nov-7	0.98 Nov-6	1.06 Nov-8	1.30 Apr-7	1.62 Apr-6	1.77 Apr-5	1.77 Apr-3	1.77 Mar-29	2.24 Mar-24	2.67 Mar-14	2.75 Feb-12
226	Santiago Crk @ Santa Ana	1.06 Nov-7	1.06 Nov-6	1.10 Nov-8	1.34 Apr-7	1.58 Apr-6	1.73 Apr-5	1.73 Apr-3	1.73 Mar-29	2.24 Mar-24	2.71 Mar-14	2.75 Feb-12
239	Westminster Ch	1.02 Apr-10	1.02 Apr-9	1.10 Apr-8	1.26 Apr-7	1.54 Apr-6	1.54 Apr-4	1.54 Apr-2	1.54 Mar-28	2.05 Mar-23	2.80 Mar-13	2.87 Jan-25
248	Coto De Caza	0.99 Nov-27	1.11 Jan-24	1.11 Jan-23	1.26 Nov-27	1.30 Nov-27	1.62 Nov-27	2.05 Nov-26	2.05 Nov-21	2.21 Jan-19	2.92 Nov-6	3.47 Nov-27
256	Lower Silverado Cyn	0.99 Jan-7	1.50 Jan-7	1.50 Jan-6	1.23 Nov-10	1.58 Mar-20	1.85 Nov-10	2.32 Nov-9	2.32 Nov-4	2.32 Oct-30	2.99 Oct-20	3.98 Nov-10
261	East Garden Grove Wintersburg	1.30 Apr-11	1.30 Apr-10	1.34 Apr-8	1.54 Apr-7	1.73 Apr-6	1.77 Apr-5	1.77 Apr-3	1.77 Mar-29	2.32 Mar-24	2.91 Mar-14	2.99 Feb-12
263	Corona Del Mar	0.79 Apr-10	0.91 Jan-24	0.91 Jan-23	0.95 Dec-1	1.26 Apr-6	1.26 Apr-4	1.26 Nov-27	1.38 Jan-17	1.85 Mar-23	2.21 Mar-13	2.52 Feb-11
265	Brea	1.03 Apr-11	1.03 Apr-10	1.03 Apr-9	1.14 Apr-7	1.73 Apr-6	1.93 Apr-5	1.93 Apr-3	1.93 Mar-29	2.09 Mar-24	2.64 Mar-14	2.68 Feb-12

Table 24
(CONTINUED)

Public Facilities and Resources Department
**LONG - DURATION INTENSITY DATA
FOR SELECTED RAINFALL STATIONS**
1998-1999
(MAXIMUM PRECIPITATION IN INCHES)

STATION		DURATION IN DAYS										
		2	3	4	5	6	8	10	15	20	30	60
283	Peters Canyon Wash	1.06 Jan-25	1.06 Jan-24	1.06 Jan-23	1.06 Jan-22	1.22 Dec-1	1.37 Jan-24	1.54 Nov-27	1.54 Nov-22	1.65 Jan-17	2.40 Nov-7	2.84 Nov-28
294	Anaheim Agriculture	1.03 Apr-11	1.03 Apr-10	1.03 Apr-9	1.18 Apr-7	1.58 Apr-6	1.66 Apr-5	1.66 Apr-3	1.66 Mar-29	2.17 Mar-24	2.76 Mar-14	2.87 Jan-25
1100	Lacouaque	0.86 Nov-7	0.86 Nov-6	0.86 Nov-5	1.30 Dec-1	1.30 Nov-30	1.38 Nov-28	1.81 Nov-26	1.81 Nov-21	1.81 Nov-16	2.75 Nov-6	3.11 Oct-22
1111	Santa Ana Delhi	1.19 Jan-25	1.19 Jan-24	1.19 Jan-23	1.23 Jan-25	1.26 Apr-6	1.62 Jan-24	1.62 Jan-22	1.82 Jan-22	1.97 Jan-17	2.32 Nov-7	2.96 Jan-25
1117	Anaheim Barber City	1.30 Apr-11	1.30 Apr-10	1.34 Apr-8	1.54 Apr-7	1.81 Apr-6	1.85 Apr-5	1.85 Apr-3	1.85 Mar-29	2.24 Mar-24	2.95 Mar-14	3.03 Feb-12
1120	Laguna Beach	0.90 Nov-7	1.03 Jan-24	1.03 Jan-23	1.22 Dec-1	1.22 Nov-30	1.50 Jan-19	1.70 Nov-26	1.93 Jan-17	2.17 Jan-16	2.68 Nov-6	3.15 Nov-28
1130	Laguna Beach Audubon	0.94 Nov-7	0.94 Nov-6	0.95 Dec-1	1.26 Nov-27	1.50 Apr-6	1.66 Nov-27	1.89 Nov-26	1.89 Nov-21	2.05 Mar-23	2.91 Nov-6	3.23 Nov-22
1140	Fullerton Airport	1.26 Jan-25	1.30 Jan-25	1.30 Jan-24	1.30 Jan-23	1.81 Apr-6	1.89 Apr-5	1.89 Apr-3	1.97 Jan-22	2.33 Mar-24	3.00 Mar-14	3.39 Jan-25
1141	Upper Aliso Creek	0.91 Jan-25	1.38 Jan-24	1.38 Jan-23	1.38 Jan-22	1.38 Jan-21	1.69 Jan-19	1.85 Nov-27	2.00 Jan-17	2.28 Jan-17	2.52 Jan-11	3.23 Nov-28
1145	Pico Basin San Clemente	0.91 Nov-7	1.02 Jan-24	1.02 Jan-23	1.34 Dec-1	1.34 Nov-30	1.69 Nov-27	2.08 Nov-26	2.08 Nov-21	2.08 Nov-16	3.03 Nov-6	3.47 Oct-22
1150	Costa Mesa	0.82 Apr-10	1.02 Jan-24	1.02 Jan-23	1.02 Jan-22	1.26 Apr-6	1.42 Jan-24	1.42 Jan-22	1.62 Jan-17	1.81 Jan-17	2.16 Nov-6	2.48 Jan-25
1155	Segunda Desheca	1.18 Nov-7	1.22 Nov-7	1.22 Nov-6	1.34 Dec-1	1.53 Apr-6	1.77 Nov-27	1.93 Nov-26	1.93 Nov-21	2.09 Mar-23	3.15 Nov-6	3.38 Oct-21
1160	El Cariso Guard	0.98 Nov-7	1.03 Jan-25	1.10 Nov-8	1.10 Nov-7	1.10 Nov-6	1.46 Jan-20	1.66 Nov-27	1.66 Nov-22	1.93 Jan-17	2.76 Nov-7	3.39 Nov-28
1170	Upper Sliverado	1.57 Jan-26	1.85 Jan-24	2.12 Jan-24	2.12 Jan-23	2.64 Apr-6	2.68 Apr-5	3.27 Apr-2	3.31 Mar-29	3.70 Mar-24	4.41 Mar-14	5.08 Feb-23

Figure 1

HISTORICAL PRECIPITATION STATIONS LOCATION MAP

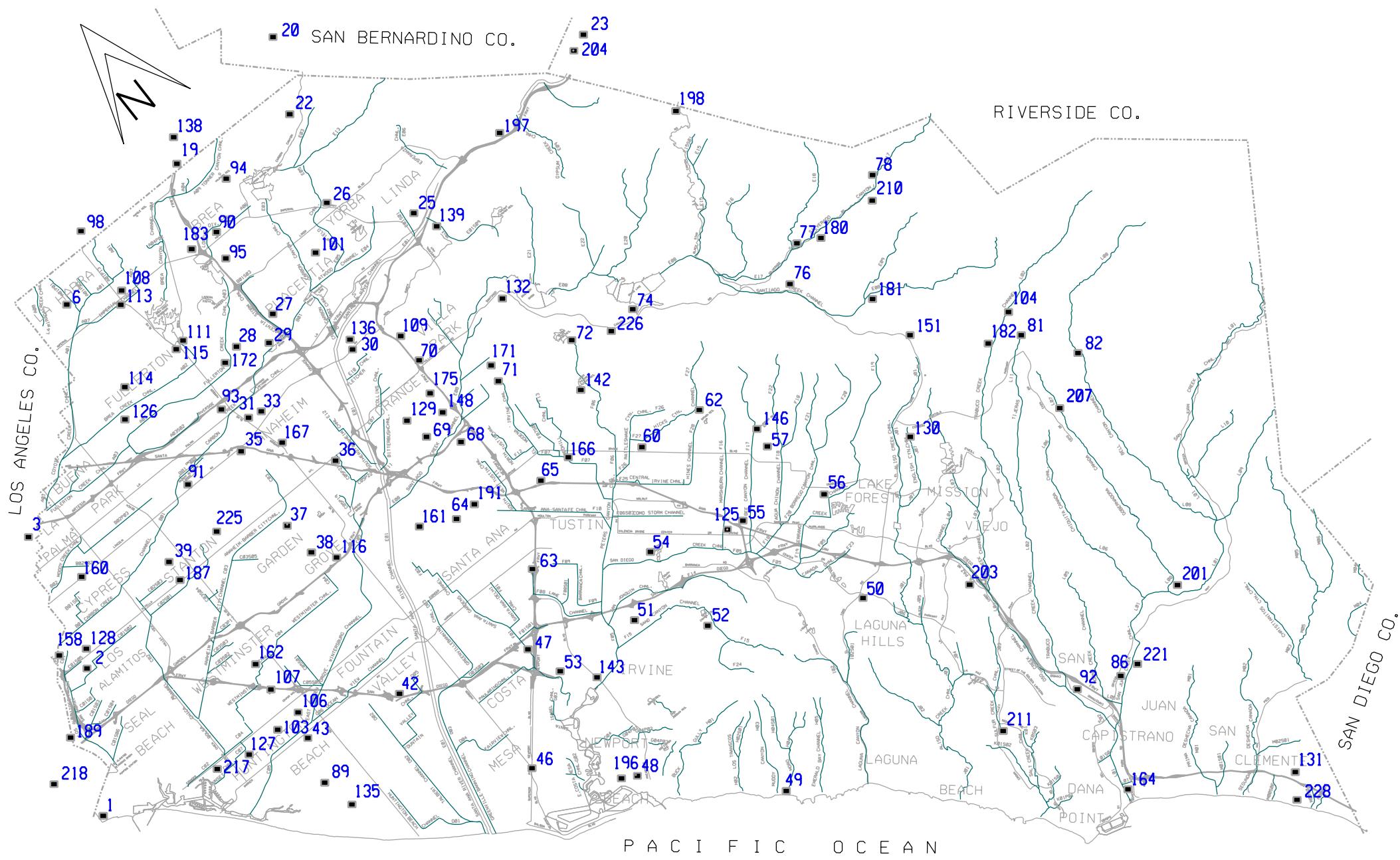


Figure 2

ACTIVE RECORDING AND NON RECORDING PRECIPITATION STATIONS LOCATION MAP

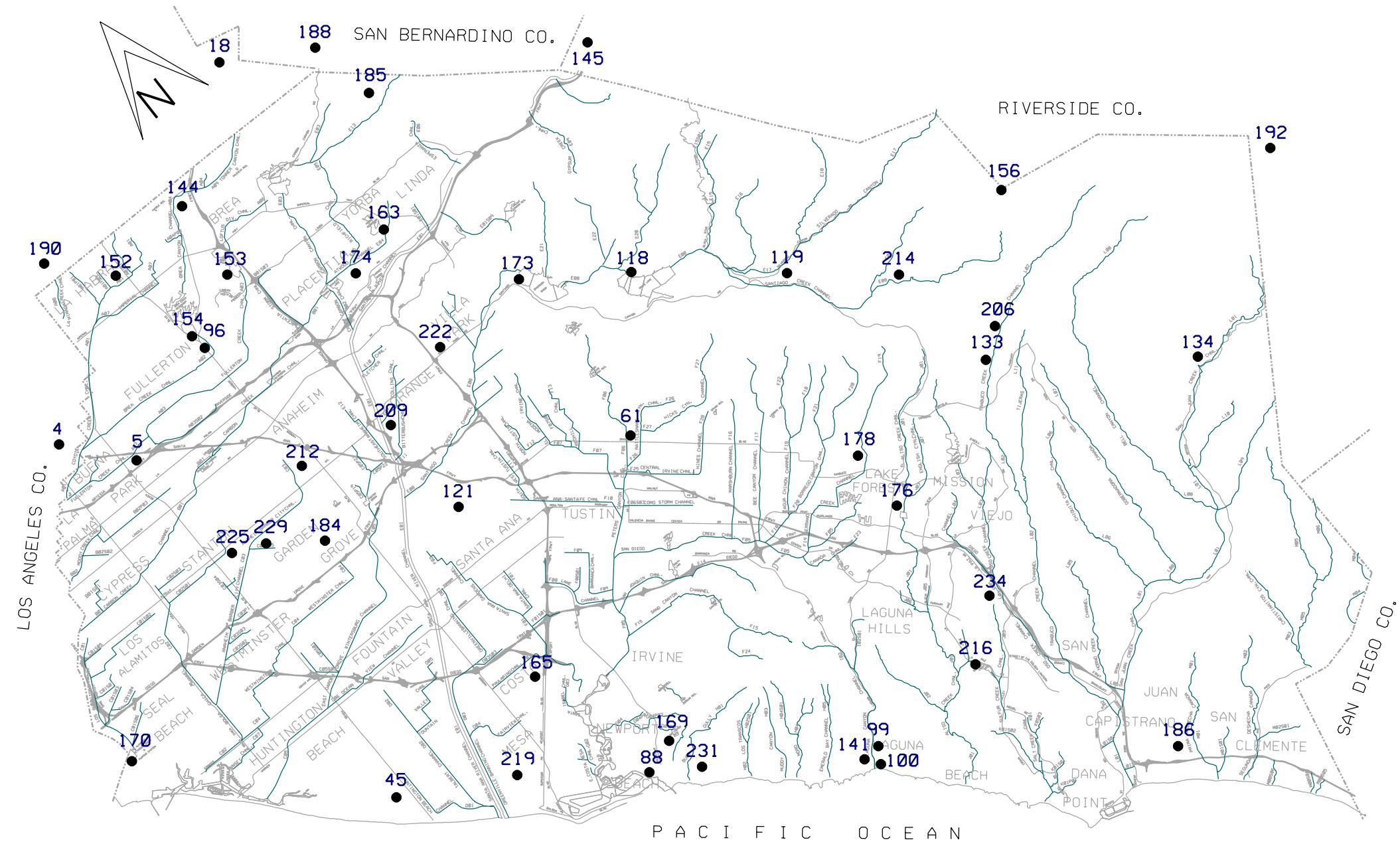


Figure 3

ACTIVE ALERT STATIONS

LOCATION MAP

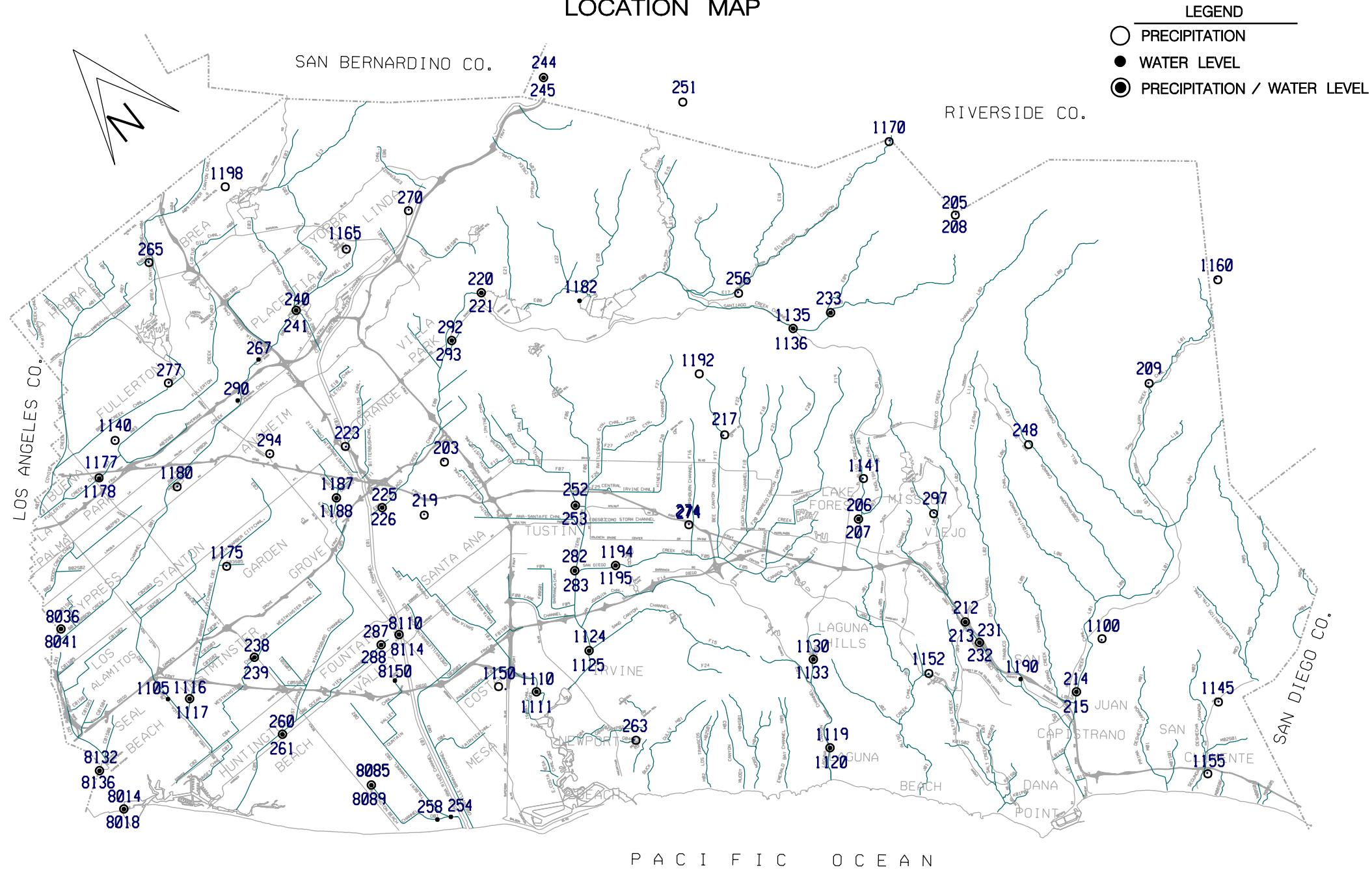


Figure 4
ALERT System
Telemetry Components

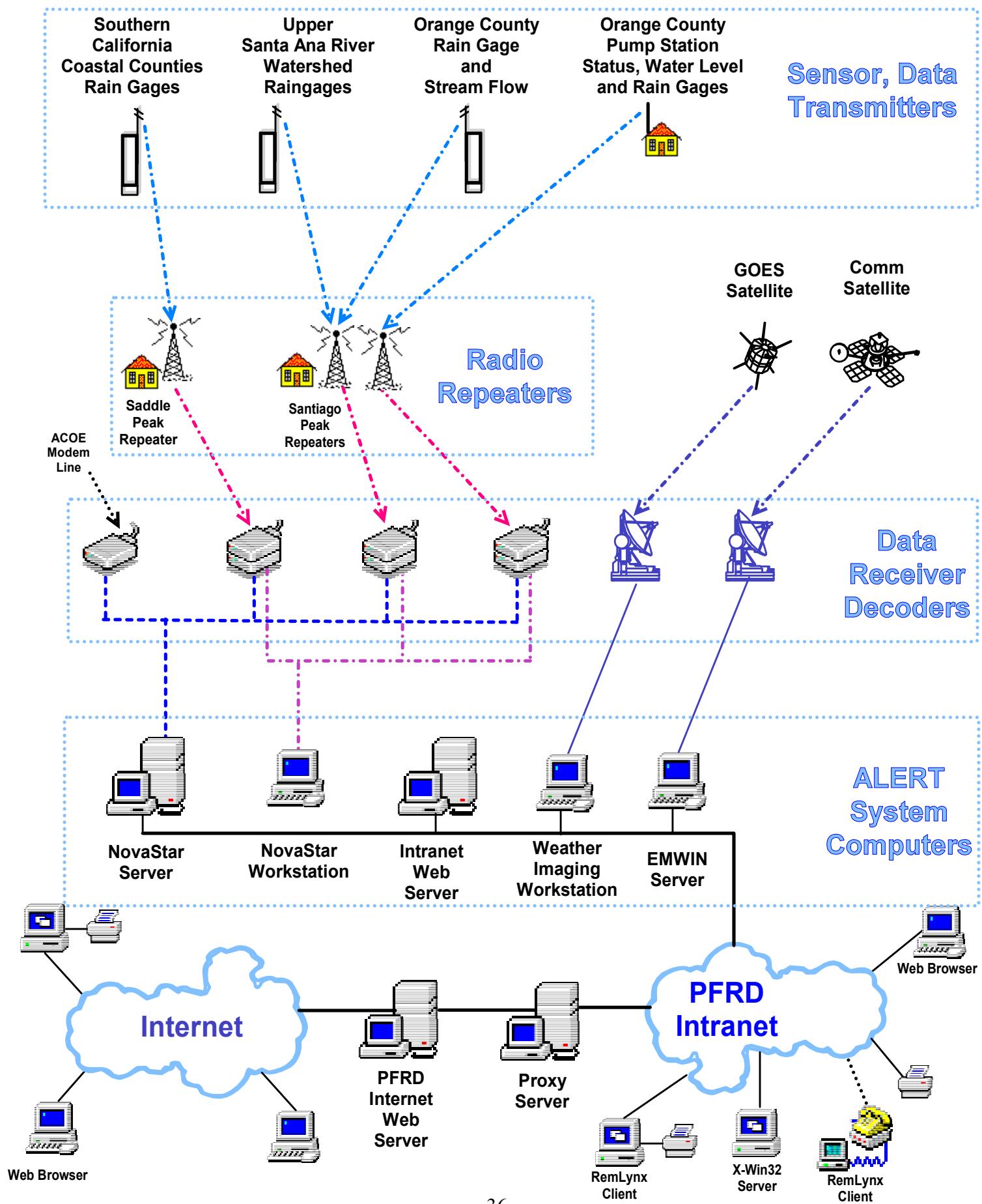
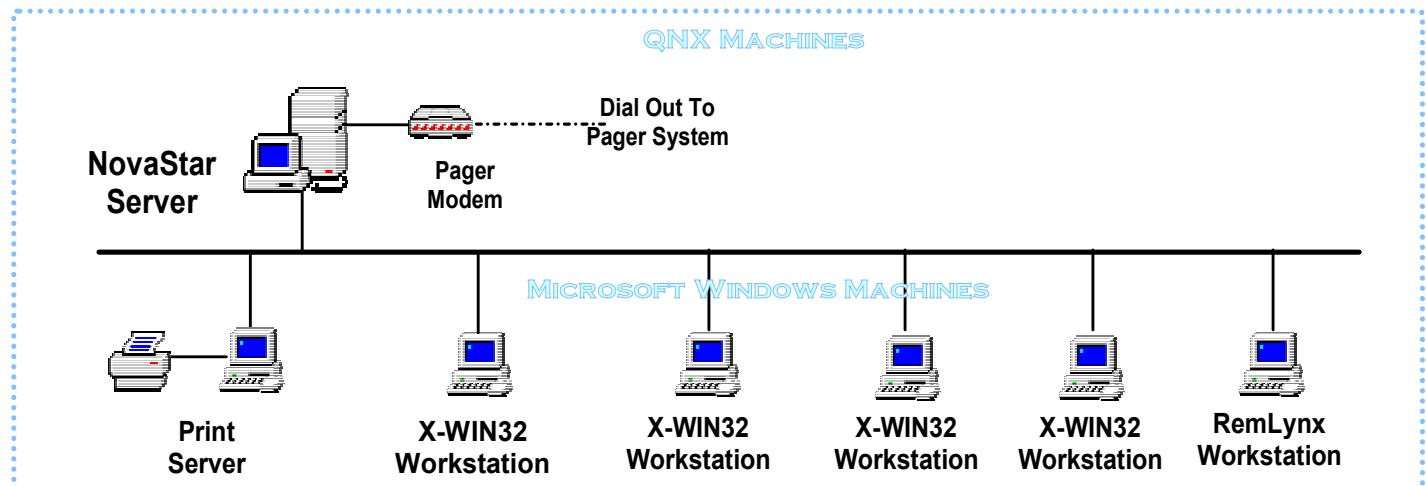
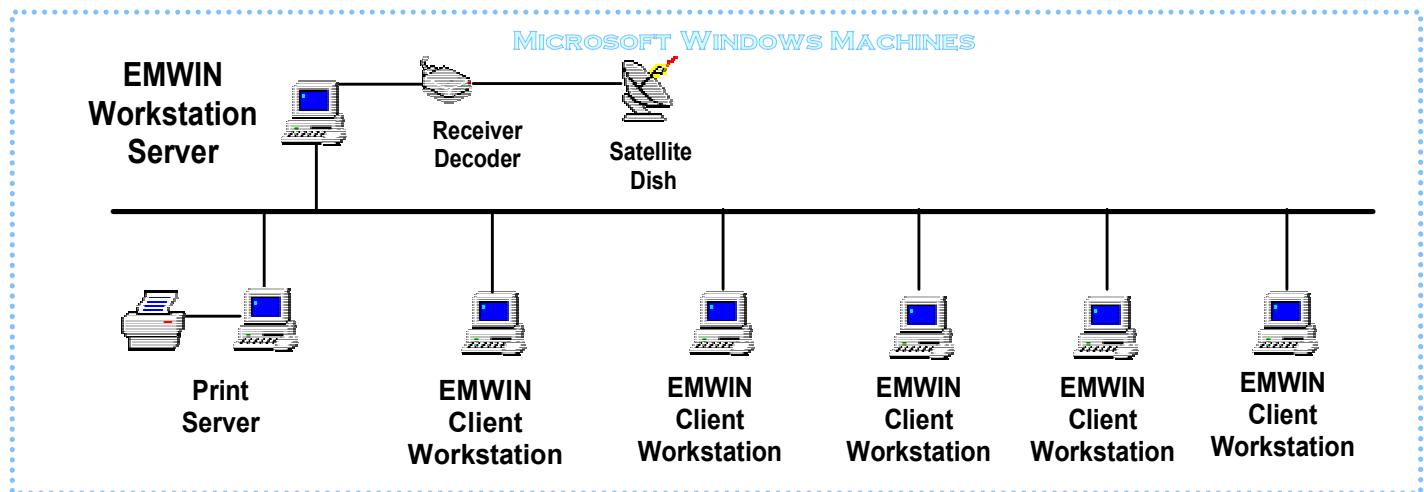


Figure 4 Continued

ALERT System Networked Computers



ALERT System Networked Computers



EMWIN System Networked Computers

Figure 5

SELECTED RAINFALL STATIONS
LOCATION MAP

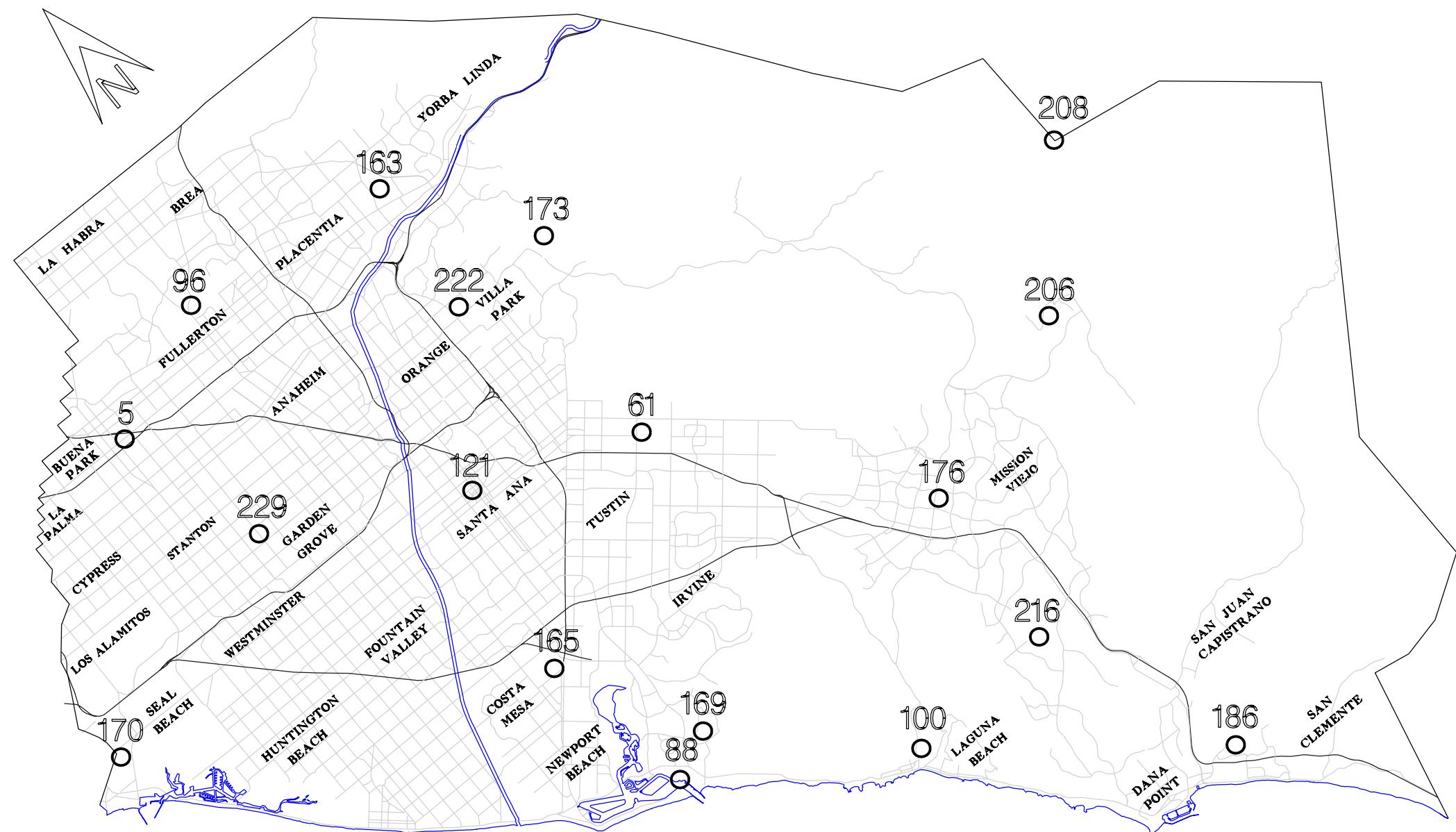


Figure 6

SELECTED RAINFALL STATIONS
SHORT – LONG TERM INTENSITY DATA
LOCATION MAP

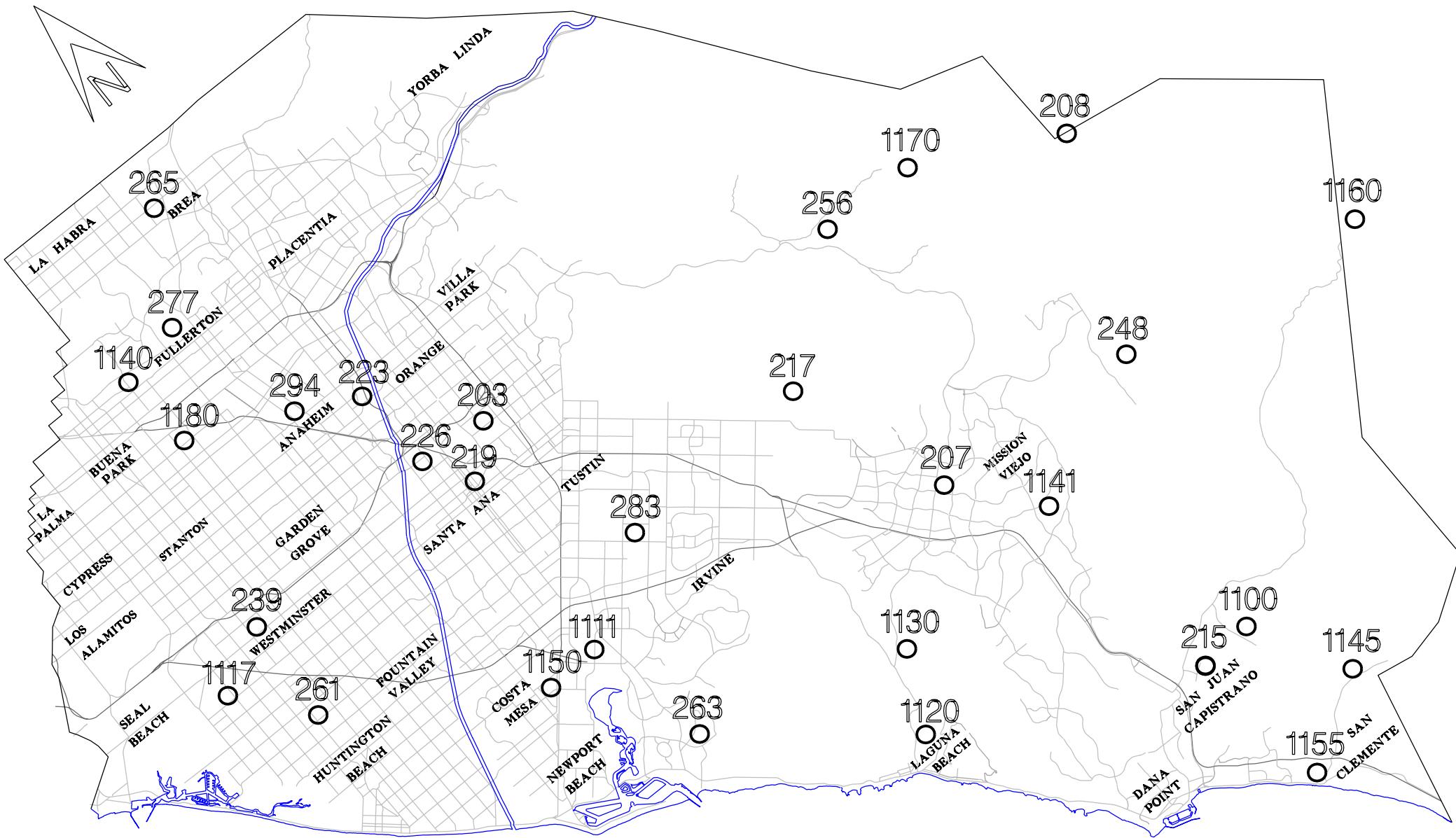
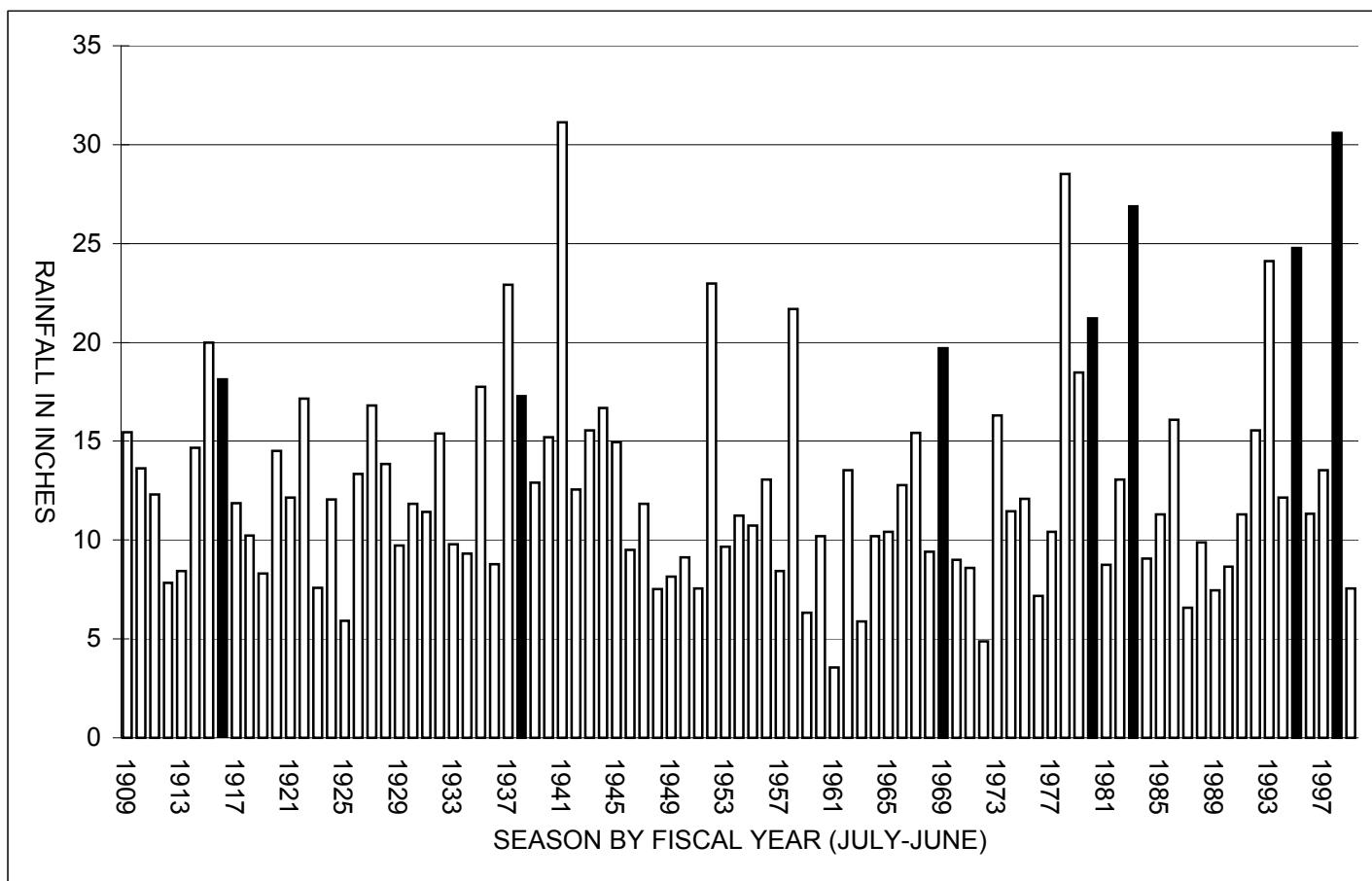


Figure 7

YEARLY RAINFALL TOTALS AND FLOOD YEARS *
AT SANTA ANA STATION 121
(1909-1999)



* Flood Year - Localized ponding and/or overtopping of flood control facilities. Note: Not an official Department designation.

Figure 8

ISOHYETAL MAP 1998-1999

Lines of Equal Precipitation (in inches)

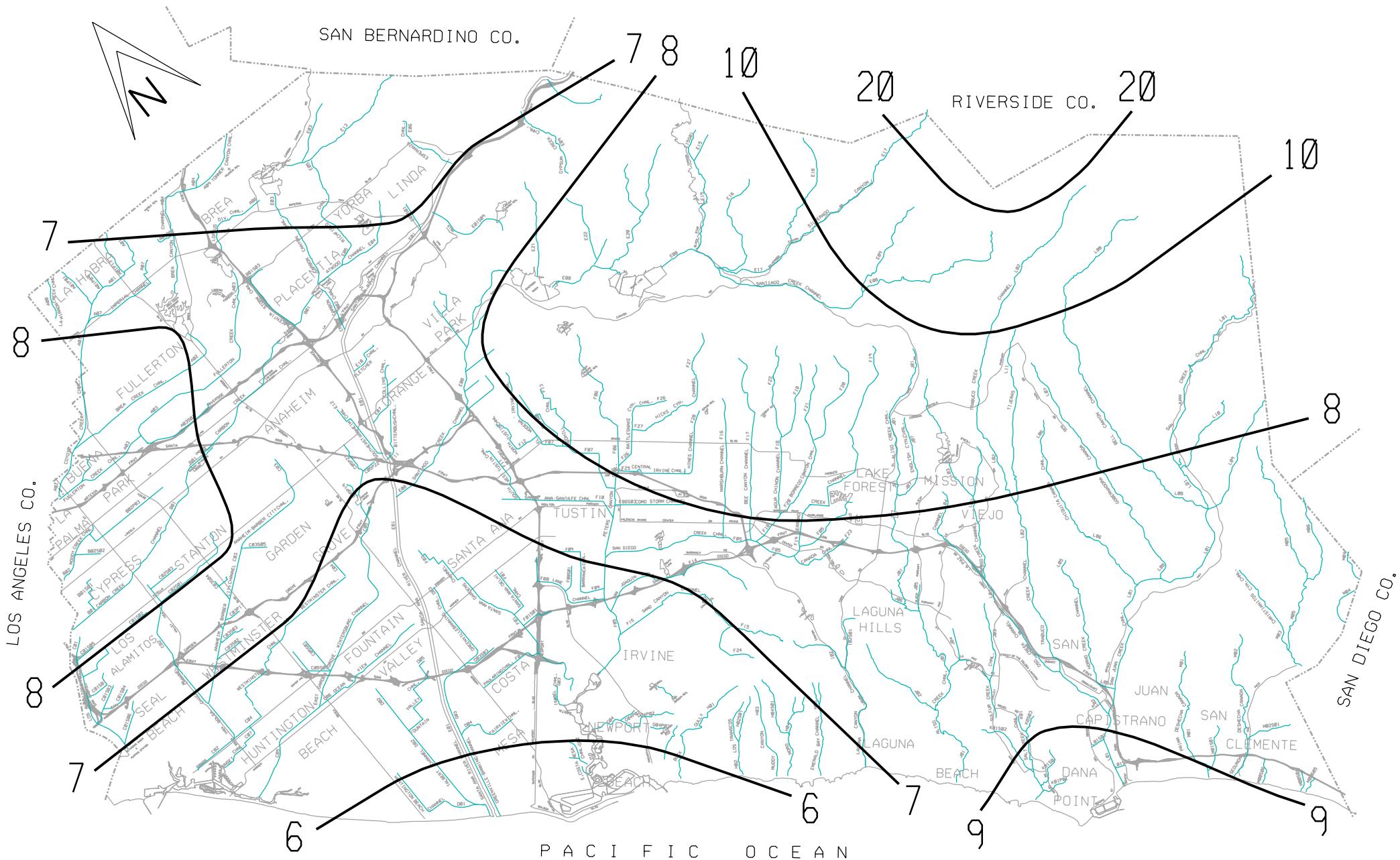
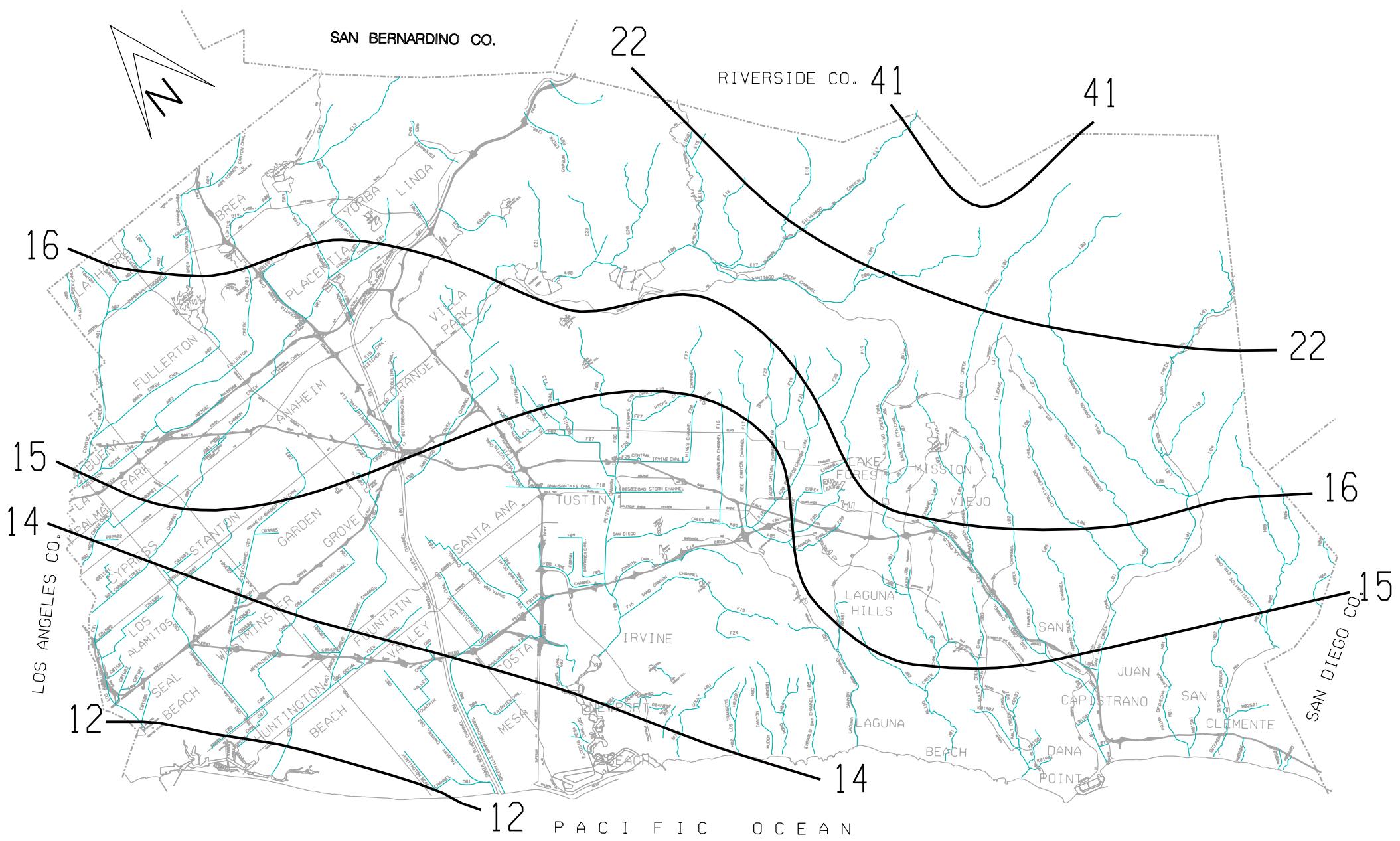


Figure 9
 ISOHYETAL MAP - 25 YEAR MEAN 1974-1999
 LINES OF EQUAL PRECIPITATION (IN INCHES)



SECTION 3.0

STREAMFLOW

3.0 STREAMFLOW

3.1 Overview

PFRD operates and maintains nineteen streamgaging and two tidal stations in Orange County. Each station is equipped with a continuous water-stage recorder and ALERT transmitter/data logger and water level sensor. The ALERT water level sensor provides the ability to monitor the stage at each station in real time. The water level sensor identifies a change in stage sending a signal to the ALERT transmitter which transmits the station identification and a water level value to the base station computer located at the PFRD Katella Facility. The ALERT water level data is stored on a server and is available as a backup to the water stage recorder charts.

Mean daily and total annual discharges are computed from station water stage recorder charts and ALERT data. The Western Hydrologic Data Reduction System is used to assist in computation. Automatic computation of surface water records is performed by electronically converting gage heights to discharges from channel ratings. Annual discharge data associated with each station are stored on a server. Some records are available on the Internet at www.oc.ca.gov/prfrd/.

3.2 1998-1999 Data Presentation

Figure 10 shows the location of the PFRD streamgaging and tidal stations. Streamflow summaries are presented in Table 25 and include peak discharge, minimum and maximum discharges, and total runoff volume. Daily discharge summaries for the stations are presented in Tables 27 through 41. Location maps and specifics for each station are presented in Figures 12 through 26.

Historical discharge summaries for each of the gaging stations are listed in Appendix A.

The USGS has several streamgaging stations in or affecting Orange County. Listed in Table 26 is the drainage area, period of record and momentary peak discharge for each respective station. Station locations of the USGS gaging stations are shown in Figure 11. Complete data for the USGS stations are published in the report entitled “Water Resources Data for California (Part 1).”

The maximum peak discharge for all runoff stations was 3,210 cfs, which was recorded at the San Diego Creek-Campus Drive station. Two streamgaging stations, Bolsa Chica Channel and San Diego Creek at Campus, recorded the lowest annual discharge volume (in acre feet) on record.

Discharge records are not included for Lower Oso Creek, Oceanview Channel and Alameda Storm Drain. The stage-discharge relationship for lower Oso is presently being defined and Oceanview Channel and Alameda were undergoing channel improvements and gage house replacements.

Table 25

**DISCHARGE SUMMARY
PFRD STREAMGAGING STATIONS
(1998-1999)**

OCPFRD NO.	STATION NAME	MOMENTARY PEAK CFS	DATE	MAX DAY IN CFS	MIN DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
2	Fullerton Creek at Richman	491	15-Mar-99	106	0.18	3.89	2820
4	Aliso Creek near Jeronimo	254	28-Nov-98	31	0.36	2.06	1490
207	Westminster Channel at Hazard	485	08-Nov-98	64	0.23	5.59	4040
214	Santiago Creek at Villa Park Dam	25.8	03-Nov-98	25.8	0.00	29.50	5869
216	EI Modena - Irvine at Michelle	1140	07-Nov-98	91	0.84	2.63	1910
217	East Garden Grove-Wintersburg	1430	08-Nov-98	279	5.60	15.00	10850
218	Oso Creek at Crown Valley Pkwy	1690	28-Nov-98	136	0.00	5.57	4030
220	Santa Ana Delhi at Irvine Ave.	1330	08-Nov-98	165	0.42	4.00	2890
222	Laguna Canyon at Woodland	158	25-Mar-99	34	0.16	1.04	755
225	Bolsa Chica at Westminster	1460	08-Nov-98	157	0.22	2.95	2140
226	San Diego Creek at Campus Dr.	3210	08-Nov-98	452	3.50	23.90	17330
230	Peters Canyon Wash at Barranca	1770	26-Jan-99	199	4.60	12.00	8700
231	San Diego Creek at Culver	724	25-Mar-99	153	0.21	7.59	5500
232	Anaheim Barber City at Ranch Rd.	1340	07-Nov-98	238	1.20	10.10	7300
1187	Upper EGG-Wintersburg at Allard	117	08-Nov-98	14	0.00	0.29	209

Table 26

**USGS DISCHARGE SUMMARY
HISTORICAL / PRESENT
STATIONS IN OR AFFECTING ORANGE COUNTY**

STATION NAME	DRAINAGE AREA SQ-MI	PERIOD OF RECORD		MOMENTARY PEAK	
		FROM	TO	CFS	DATE
Arroyo Trabuco at Del Obispo	54.1	1997	Present	10000	23-Feb-98
Brea Creek Below Brea Dam	21.6	1942	Present	1700	18-Feb-80
Carbon Creek Below Carbon Dam	19.5	1961	Present	796	01-Mar-83
Fullerton Creek Below Fullerton Dam	4.9	1941	Present	392	01-Mar-83
San Juan Creek at San Juan Capistrano	117.0	1969	1986	22387	25-Feb-69
San Juan Creek at La Novia St.	109.0	1928	Present	25600	05-Mar-95
Santa Ana River Below Prado Dam	1490.0	1940	Present	7440	21-Feb-80
Santa Ana River at Santa Ana *	1700.0	1923	Present	! 46300	03-Mar-38
Santiago Creek at Modjeska	13.0	1961	Present	6520	25-Feb-69
Santiago Creek at Santa Ana	98.6	1928	Present	6600	25-Feb-69

* Excludes 750 Sq. Mi. above Lake Elsinore.

! Approximately 60,000 CFS is not included because it broke out of the river channel upstream of the gaging station.

Figure 10

PUBLIC FACILITIES AND RESOURCES DEPARTMENT

STREAMGAGING STATIONS / TIDE STATIONS

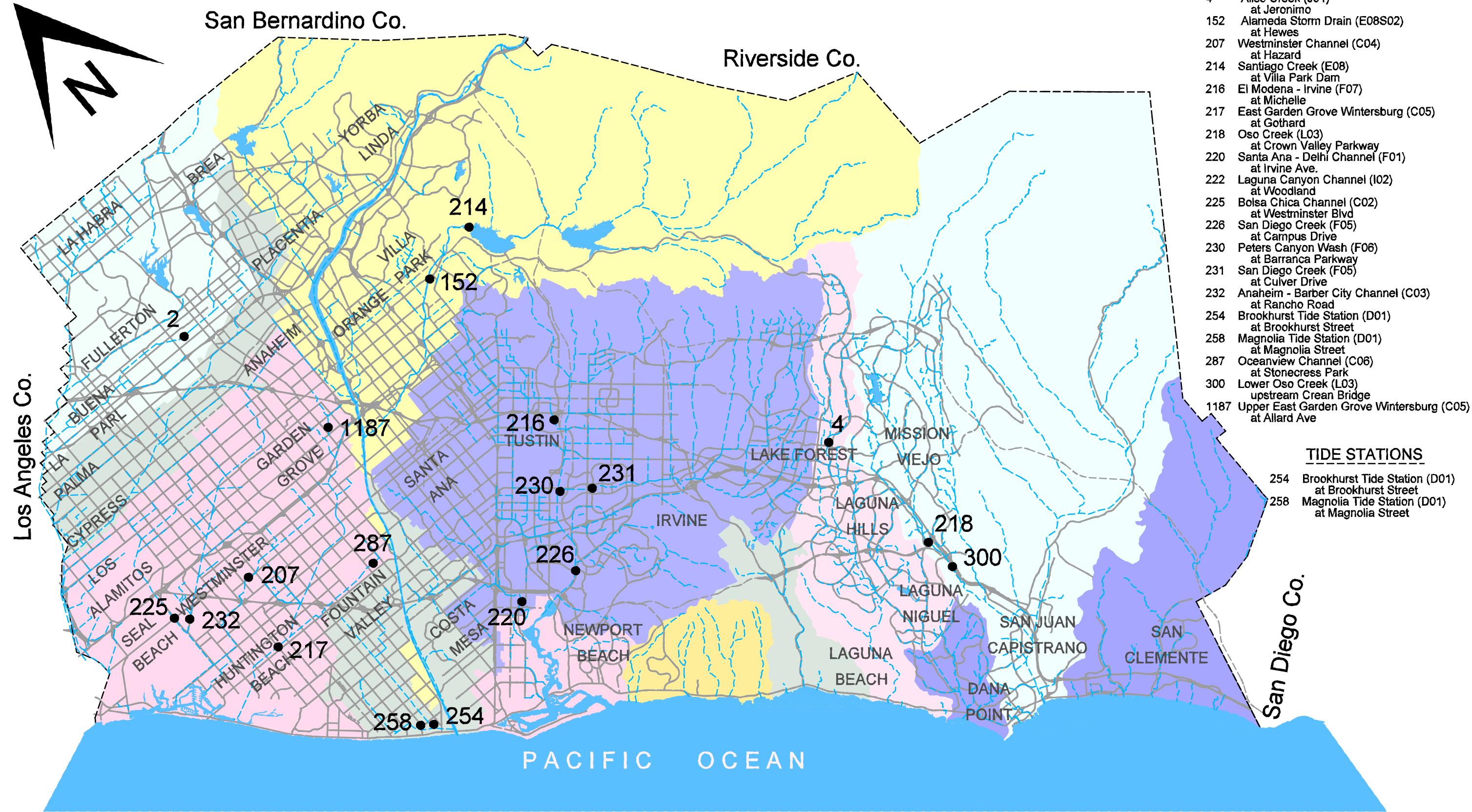


Figure 11

USGS STREAMGAGING STATIONS LOCATION MAP

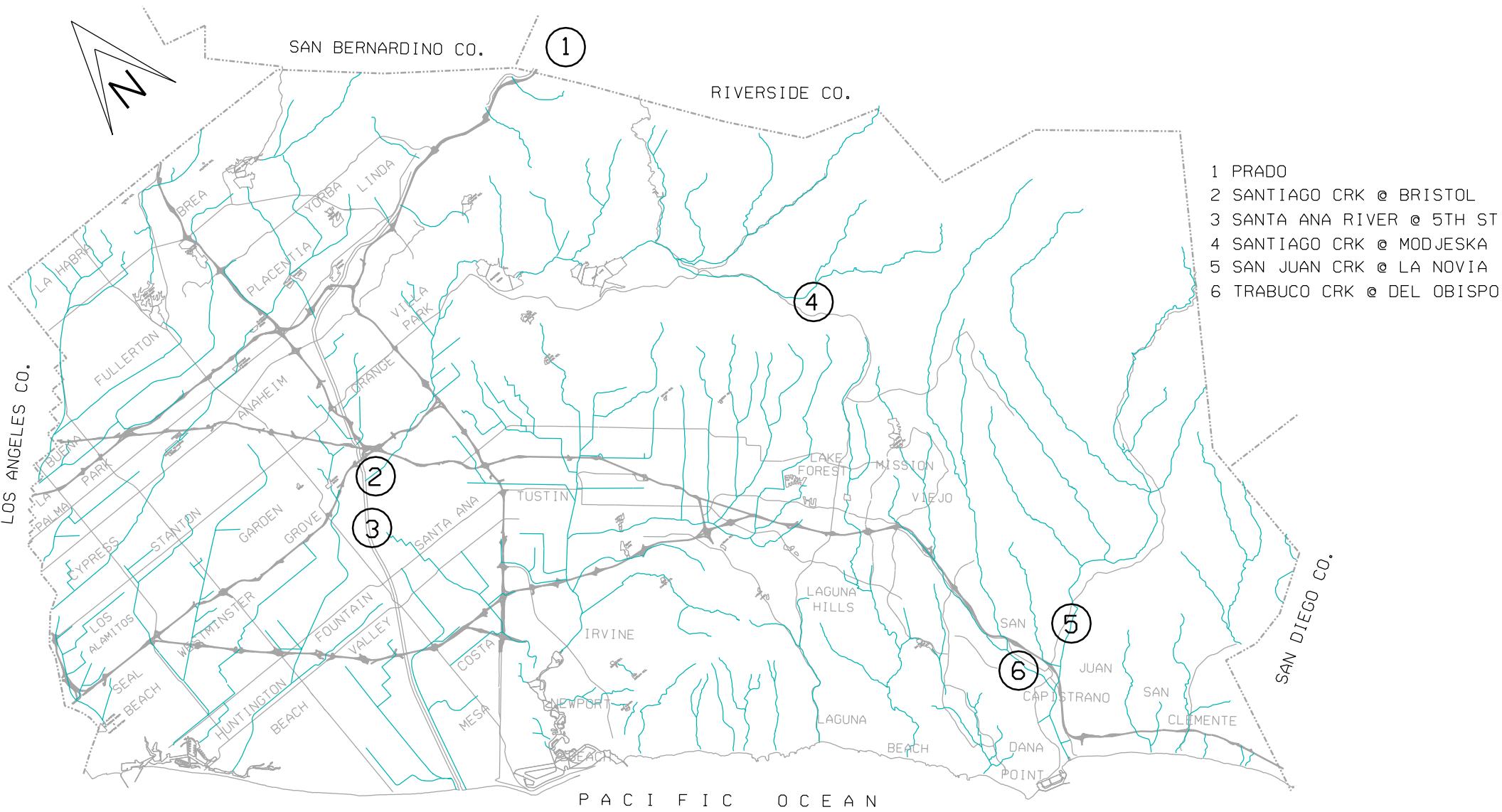
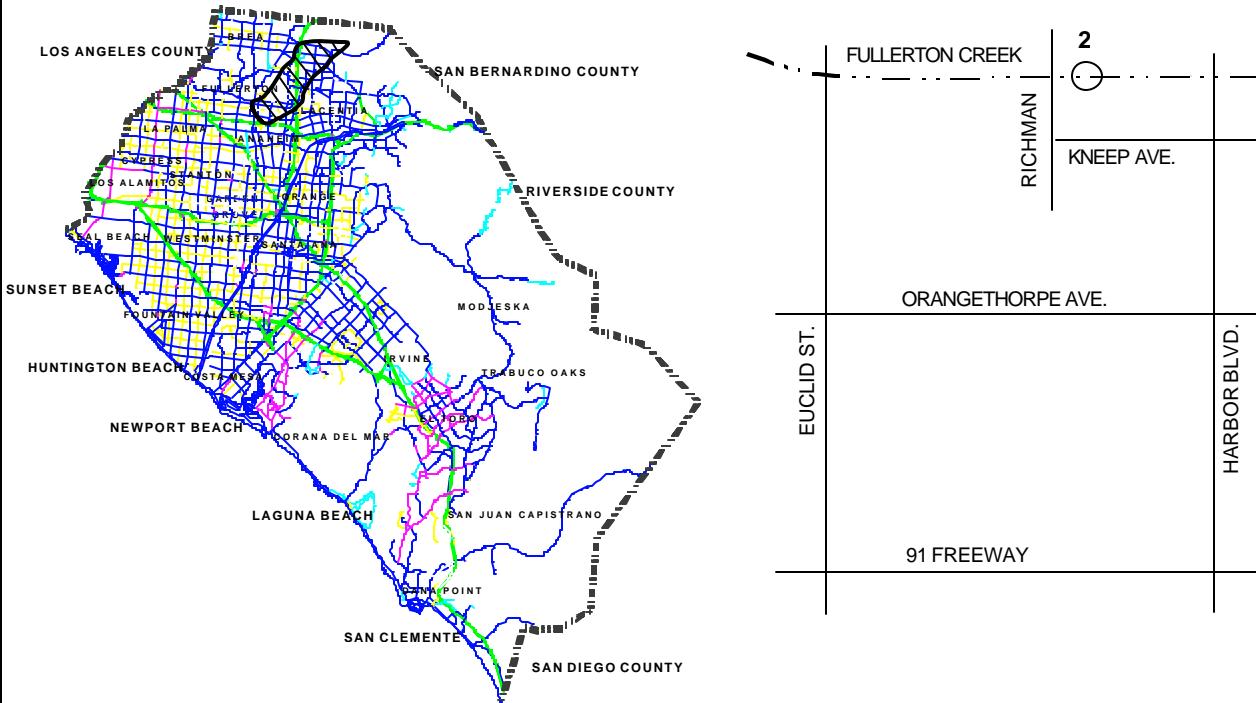


Figure 12

FULLERTON CREEK AT RICHMAN STATION NO. 2



LOCATION:	Latitude $33^{\circ} 51' 47''$, Longitude $117^{\circ} 55' 55''$. On the right bank approximately 125 ft. east of Richman Ave. and 180 ft. north of Knepp Ave.
DRAINAGE AREA:	12.1 sq. Mi (31.3 km^2) including 7.0 sq. mi. (18.1 km^2) above Fullerton Dam.
GAGE ELEVATION:	126.4 ft. (38.5 m) MSL.
HYDRAULIC CONTROL:	Supercritical flow - concrete lined, trapezoidal channel.
EQUIPMENT:	Stevens A-71 water-stage recorder with float, ALERT rain gage and USCOE water level equipment.
PERIOD OF RECORD:	November 1959 to present.
REMARKS:	Flow regulated by Fullerton Flood Control Reservoir since October 1941.
RATING CURVE ACCURACY:	Good

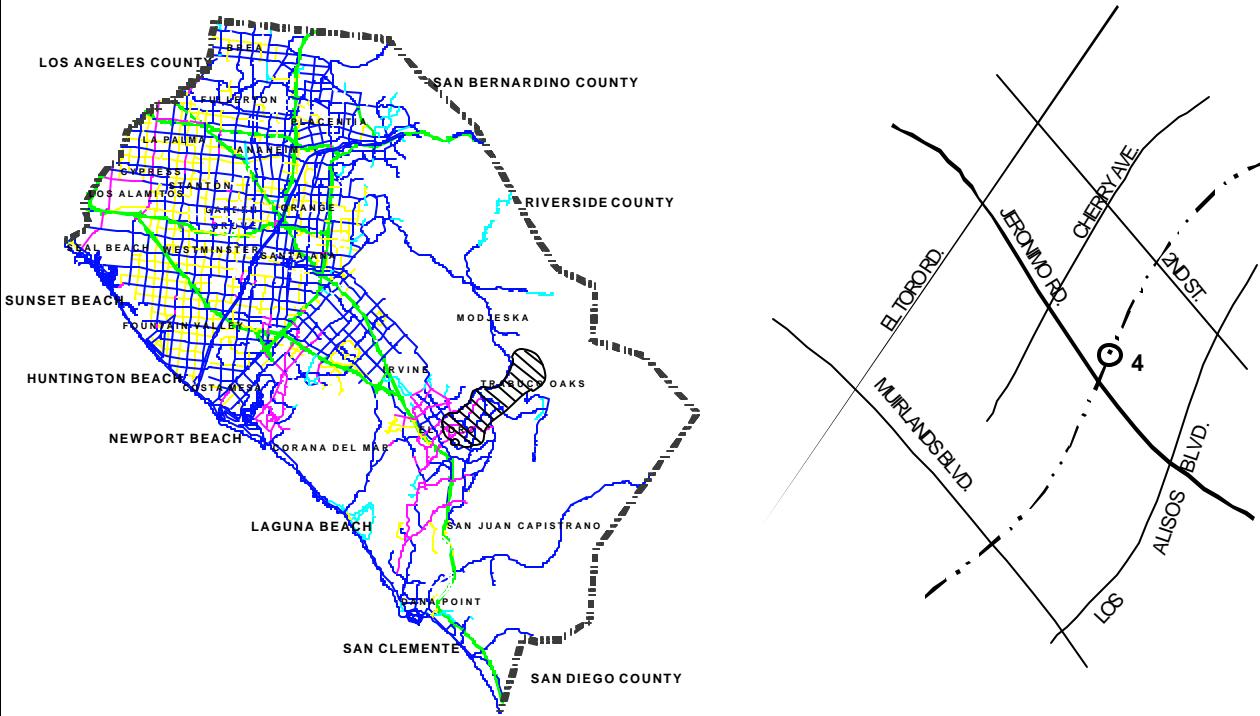
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
2 FULLERTON CREEK AT RICHMAN

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	1.9	.66	.95	.66	1.2	35	.70	.92	.75	1.7	1.3	.75
2	1.6	.56	1.0	.99	1.2	32	.66	.92	.75	1.8	1.3	5.4
3	1.5	.36	1.1	1.1	1.2	19	.66	.92	1.0	1.8	1.3	.81
4	1.3	.60	.74	.99	1.1	18	.66	19	1.3	1.8	1.1	.83
5	1.2	.99	.55	.89	1.1	42	.66	6.4	.92	2.0	1.2	.51
6	1.1	.63	.40	.81	1.1	102	.44	1.4	.92	87	.75	.51
7	.96	.75	.29	.72	1.1	14	.44	1.3	.92	44	.75	.55
8	.86	.88	.20	46	1.1	2.9	.44	1.3	.96	6.4	.75	.58
9	.85	.98	.18	1.8	1.3	1.5	.51	31	1.0	13	.75	.55
10	.85	1.1	.20	1.7	1.4	.90	.51	19	1.0	1.4	.75	.58
11	.85	1.1	.21	1.7	1.5	.42	.51	1.2	1.9	106	.75	.58
12	.88	1.2	.21	1.8	1.6	.37	.51	.99	1.2	65	.80	.58
13	.92	1.2	.21	1.8	1.7	.32	.51	.99	1.1	2.7	.88	.58
14	.92	.46	.22	2.0	1.8	.28	.51	.75	1.1	1.2	.96	.55
15	.99	.51	.25	2.0	2.0	.26	.66	.75	78	.99	1.0	.51
16	.99	.58	.25	2.1	2.1	.25	.66	.66	5.1	1.1	1.1	.51
17	1.0	.64	.25	2.0	2.2	.25	.66	.58	1.5	1.1	1.1	.51
18	1.1	.70	.25	1.8	2.2	.24	.66	.58	.75	1.1	1.1	.51
19	1.1	.75	.23	1.5	2.3	2.2	.66	.58	.75	1.3	1.1	.51
20	1.2	.84	.21	1.4	2.3	5.7	13	.58	.75	1.4	1.1	.51
21	1.3	.85	.23	1.2	2.5	1.9	2.7	.51	.99	1.1	.99	.51
22	1.4	.85	.27	1.3	2.8	1.1	1.9	.51	.99	1.1	.99	.51
23	1.5	.85	.32	1.3	3.1	.43	1.6	.51	1.1	1.1	.99	.66
24	1.6	.85	.37	1.2	3.5	.24	1.5	.44	1.1	1.3	.99	.66
25	1.1	.85	.43	1.2	3.9	.28	7.1	.44	14	1.3	1.1	.66
26	1.0	.85	.49	1.2	3.9	.33	88	.44	4.3	1.3	.99	.58
27	.94	.85	.57	1.1	2.2	.38	36	.39	1.7	1.2	.99	.58
28	.76	.85	.51	1.1	78	.44	9.0	.39	1.1	1.2	.99	.58
29	.68	.85	.51	1.1	24	.49	1.4	-----	.99	1.2	1.1	.51
30	.75	.85	.58	1.1	16	.55	1.1	-----	.99	1.4	.85	.51
31	.70	.86	-----	1.1	-----	.61	1.1	-----	1.0	-----	.85	-----
TOTAL	33.80	24.85	12.18	86.66	171.4	284.34	175.42	93.45	129.93	354.99	30.67	22.18
MEAN	1.09	.80	.41	2.80	5.71	9.17	5.66	3.34	4.19	11.8	.99	.74
MAX	1.9	1.2	1.1	46	78	102	88	31	78	106	1.3	5.4
MIN	.68	.36	.18	.66	1.1	.24	.44	.39	.75	.99	.75	.51
AC-FT	67	49	24	172	340	564	348	185	258	704	61	44
CAL YEAR 1998 TOTAL	4,972.94	MEAN	13.6	MAX	426	MIN	.18	AC-FT	9,860			
WTR YEAR 1999 TOTAL	1,419.87	MEAN	3.89	MAX	106	MIN	.18	AC-FT	2,820			

Figure 13

ALISO CREEK AT JERONIMO STATION NO. 4



LOCATION:	Latitude $33^{\circ} 37' 30''$, Longitude $117^{\circ} 41' 07''$. On the right bank approximately 300 ft. upstream of Jeronimo Rd.
DRAINAGE AREA:	8.10 sq. mi (21.0 km ²)
GAGE ELEVATION:	430 ft. (131 m) MSL
HYDRAULIC CONTROL:	Downstream critical depth control and supercritical flow - step-designed concrete channel
EQUIPMENT:	Stevens A-71 water-stage recorder with Balanced Beam Manometer and ALERT rain gage and water level sensor.
PERIOD OF RECORD:	October 1930 to present
REMARKS:	Several small conservation reservoirs in watershed above gage. Normal flow affected by return flow from irrigated areas and discharge from local supply reservoir. Low flow affected by summer algae blooms in channel.
RATING CURVE ACCURACY:	Good

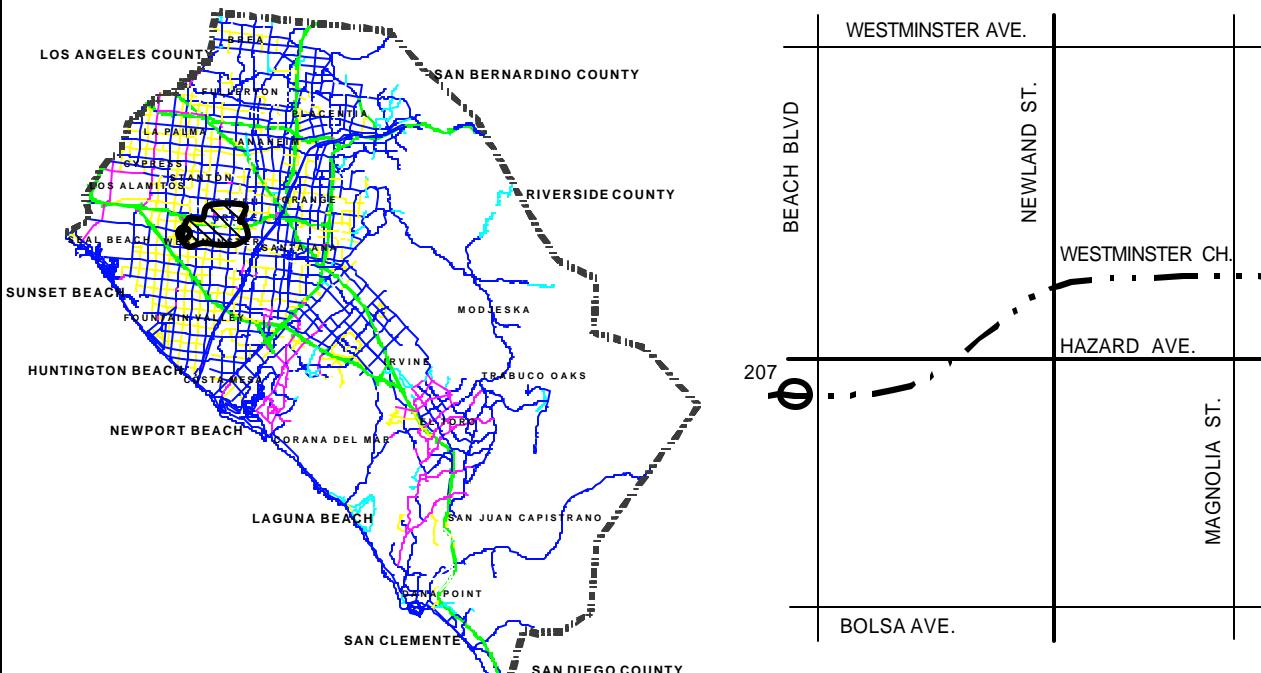
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
04 ALISO CREEK AT JERONIMO

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	2.5	.57	.79	.53	.97	7.9	.95	2.9	3.5	1.3	2.1	2.9
2	2.5	.57	.81	.73	.97	1.9	.65	1.6	3.6	1.6	2.2	8.1
3	2.5	.52	4.4	.97	.79	1.1	.57	1.7	4.9	1.5	2.4	.65
4	2.7	.67	1.9	.98	1.1	2.2	.67	3.6	11	1.5	2.5	.95
5	2.7	.84	.57	.76	.97	3.6	.84	1.8	3.0	1.5	2.6	1.0
6	3.2	.79	.67	.73	1.0	9.6	1.1	1.8	2.7	4.7	2.9	.90
7	3.2	.86	1.6	.73	1.1	.72	1.2	2.1	5.8	12	2.9	.84
8	3.4	1.1	1.3	.73	14	.40	1.1	2.4	4.6	4.2	2.9	.91
9	3.4	.97	1.1	.66	.57	.40	1.3	8.6	4.0	3.2	2.9	.97
10	3.4	1.0	.87	.49	.68	.40	1.3	3.4	3.7	2.4	2.9	1.1
11	2.9	1.2	.77	.62	.85	.43	1.6	3.0	7.3	13	2.9	1.3
12	1.5	1.3	.49	.52	.84	.57	1.7	2.9	3.9	11	2.9	1.5
13	1.1	.67	.43	.52	.62	.75	1.5	2.8	4.6	2.4	2.9	1.8
14	1.1	.49	.43	.62	.62	.73	.84	2.7	5.5	2.0	2.9	2.1
15	1.1	.43	.69	.62	.80	.52	.91	2.7	20	1.6	2.9	2.3
16	.84	.40	.73	.69	.70	.43	.84	2.7	2.1	1.6	2.9	2.1
17	.84	.85	.55	.62	.58	.52	.78	2.7	2.6	2.0	2.9	1.9
18	.84	.73	.50	.52	.57	.57	.69	2.7	1.9	2.5	3.1	1.7
19	.97	.65	.43	.46	.68	2.3	.58	2.7	1.8	2.7	3.2	1.6
20	.73	.81	.48	.48	.78	1.6	.43	2.7	5.0	2.4	3.2	1.4
21	.84	.73	.52	.57	.88	.52	.40	2.7	2.0	2.0	3.2	1.3
22	.84	.67	.62	.62	.50	.44	.37	2.6	2.1	1.8	3.2	1.5
23	.73	.62	.71	.62	.66	.41	.36	2.4	2.0	1.4	3.2	1.6
24	.73	.62	.73	.62	.80	.48	.36	1.9	2.2	1.4	3.2	1.8
25	.62	.63	.68	.73	1.1	.57	1.5	2.1	24	1.5	3.3	1.8
26	.62	.78	.69	.73	.52	.57	31	2.4	3.2	1.6	3.4	1.8
27	.41	.61	.65	.84	.56	.57	9.1	2.8	1.2	1.7	3.4	1.9
28	.45	.50	1.2	.84	17	.62	2.2	3.1	.58	1.8	3.4	2.0
29	.63	.70	.99	.90	1.3	.62	2.2	-----	.70	1.9	3.3	2.0
30	.65	.87	.88	.94	.97	.73	2.2	-----	.85	2.0	3.1	2.1
31	.84	.82	-----	.85	-----	.97	10	-----	.89	-----	2.9	-----
TOTAL	48.78	22.97	27.18	21.24	53.48	43.14	79.24	77.5	141.22	92.2	91.7	53.82
MEAN	1.57	.74	.91	.69	1.78	1.39	2.56	2.77	4.56	3.07	2.96	1.79
MAX	3.4	1.3	4.4	.98	17	9.6	31	8.6	24	13	3.4	8.1
MIN	.41	.40	.43	.46	.50	.40	.36	1.6	.58	1.3	2.1	.65
AC-FT	97	46	54	42	106	86	157	154	280	183	182	107
CAL YEAR 1998 TOTAL	2,433.44	MEAN	6.67	MAX	482	MIN	.40	AC-FT	4,830			
WTR YEAR 1999 TOTAL	752.47	MEAN	2.06	MAX	31	MIN	.36	AC-FT	1,490			

Figure 14

WESTMINSTER CHANNEL AT BEACH BLVD.
STATION NO. 207



LOCATION: Latitude $33^{\circ} 45' 07''$, Longitude $117^{\circ} 59' 26''$. on the right bank approximately 300 ft. downstream of Beach Blvd.

DRAINAGE AREA: 6.70 sq. mi. (17.3 km²)

GAGE ELEVATION: 40.0 ft. (12.0 m) MSL

HYDRAULIC CONTROL: Subcritical flow - concrete lined, trap

EQUIPMENT: Stevens A-71 water-stage recorder with float, ALERT

PERIOD OF RECORD: October 1955 to present

REMARKS: Prior to July 1968 the gas

Beach Blvd. No regulation or diversion above gage.

ACCURACY: Fair

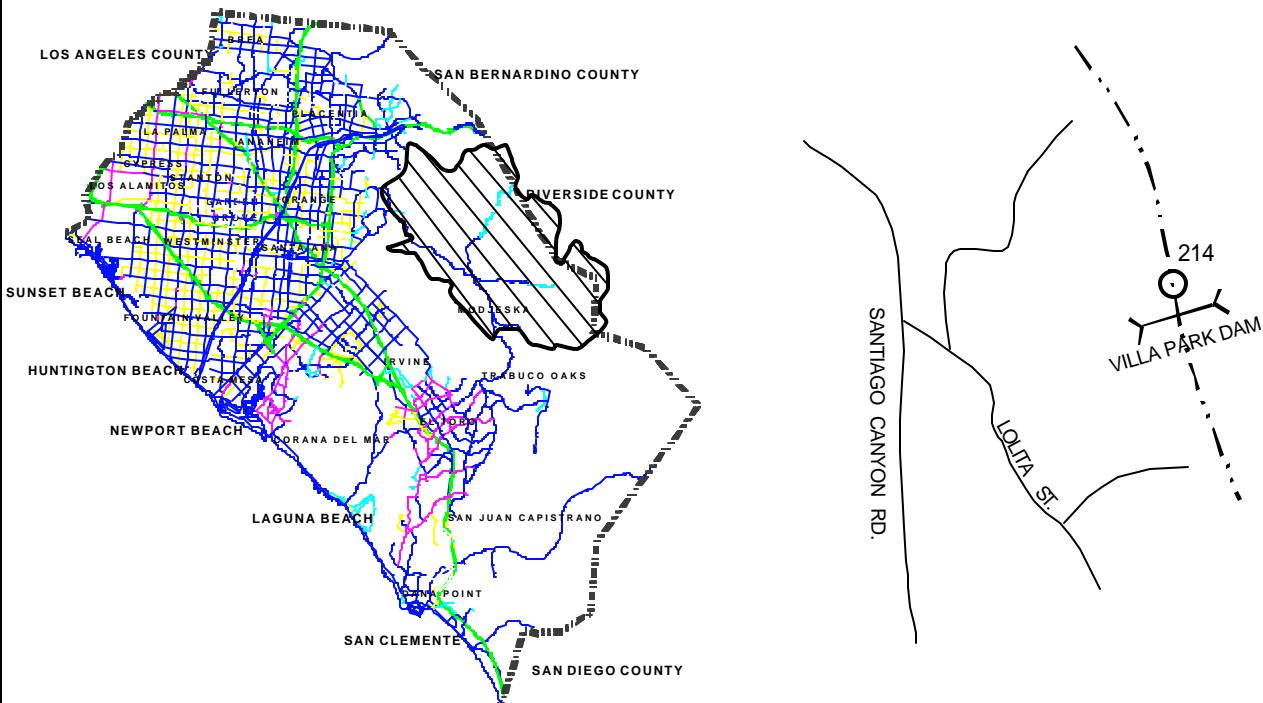
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
207 WESTMINSTER CHANNEL AT HAZARD

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	1.8	1.4	3.8	3.0	2.6	22	4.5	7.0	14	1.5	3.8	8.1
2	1.8	1.8	1.4	1.7	2.1	14	4.5	6.3	15	1.1	3.8	15
3	1.8	2.1	.80	1.5	2.4	7.4	4.5	6.2	15	.59	2.6	8.0
4	1.8	2.4	.88	1.5	2.1	14	4.3	23	15	.39	4.1	2.6
5	1.8	2.4	.72	1.5	2.1	13	4.1	25	15	.34	4.5	1.8
6	1.8	2.6	.72	1.6	1.5	25	4.1	7.0	15	19	4.8	1.8
7	2.4	2.6	.72	1.8	1.6	12	4.1	6.7	15	10	4.8	1.8
8	2.4	2.5	.72	2.4	64	3.5	4.1	6.7	15	2.6	4.8	1.8
9	2.4	2.4	1.8	2.4	1.5	2.4	4.1	17	16	2.6	4.8	1.3
10	2.1	2.4	1.8	2.4	1.8	2.4	3.8	12	16	.23	6.3	1.3
11	2.1	2.2	1.8	2.6	1.8	1.8	3.8	10	16	51	6.3	1.5
12	2.1	2.1	1.8	2.6	2.4	1.0	3.8	8.3	5.4	19	6.3	1.5
13	2.4	2.1	1.8	2.6	2.4	1.0	4.2	7.9	4.8	4.2	6.3	1.5
14	2.4	1.9	1.8	2.6	2.4	1.2	4.5	8.7	5.2	3.6	6.3	1.5
15	2.4	1.8	1.8	2.4	2.4	1.7	4.8	9.6	37	3.5	7.0	1.8
16	1.8	1.8	1.8	1.8	2.4	2.2	5.2	10	6.7	3.3	7.0	1.8
17	1.8	2.1	1.9	1.9	2.1	2.7	5.5	11	5.5	3.2	8.3	1.8
18	1.8	2.1	2.4	1.8	2.1	3.2	5.8	11	4.7	3.2	8.3	2.4
19	1.8	2.4	2.8	1.8	2.1	15	5.9	11	4.0	3.2	8.3	2.4
20	1.8	2.4	2.1	1.8	2.4	11	23	11	5.0	2.9	9.6	2.4
21	2.4	2.1	2.1	2.1	2.4	3.7	7.4	12	3.2	2.9	9.6	2.4
22	2.4	2.1	2.1	2.1	2.6	3.5	7.6	14	1.8	2.9	9.6	2.4
23	2.4	1.8	2.4	2.1	2.6	3.3	7.8	13	2.1	2.9	9.6	2.4
24	2.4	2.1	2.1	2.3	2.6	3.2	7.1	13	1.9	2.9	9.6	2.4
25	2.1	2.4	2.1	2.7	2.6	3.5	39	13	39	3.5	8.7	2.4
26	2.1	2.6	1.9	1.5	2.6	3.6	30	14	9.4	3.5	8.7	2.4
27	2.1	3.5	1.8	1.5	10	3.8	18	14	1.8	3.5	8.7	2.1
28	2.1	3.5	1.5	1.5	36	4.0	8.4	14	1.8	3.8	8.3	2.1
29	2.1	4.1	1.5	1.5	15	4.1	6.8	-----	2.1	3.8	8.3	1.8
30	1.6	4.1	1.6	2.6	14	4.1	7.1	-----	2.1	3.8	8.3	1.8
31	1.4	4.1	-----	2.6	-----	4.4	38	-----	2.2	-----	8.7	-----
TOTAL	63.6	75.9	52.46	64.2	194.6	197.7	285.8	322.4	312.7	168.95	216.1	84.3
MEAN	2.05	2.45	1.75	2.07	6.49	6.38	9.22	11.5	10.1	5.63	6.97	2.81
MAX	2.4	4.1	3.8	3.0	64	25	39	25	39	51	9.6	15
MIN	1.4	1.4	.72	1.5	1.5	1.0	3.8	6.2	1.8	.23	2.6	1.3
AC-FT	126	151	104	127	386	392	567	639	620	335	429	167
CAL YEAR 1998 TOTAL		3,092.68	MEAN	8.47	MAX	185	MIN	.57	AC-FT	6,130		
WTR YEAR 1999 TOTAL		2,038.71	MEAN	5.59	MAX	64	MIN	.23	AC-FT	4,040		

Figure 15

SANTIAGO CREEK AT VILLA PARK DAM STATION NO. 214



LOCATION:	Latitude $33^{\circ} 48' 58''$, Longitude $117^{\circ} 45' 55''$. Approximately 190 ft. downstream from the toe of the dam.
DRAINAGE AREA:	83.4 sq. mi. (216 km^2) including 63.1 sq. mi. (163 km^2) above Santiago Dam
GAGE ELEVATION:	470 ft. (143 m) MSL
HYDRAULIC CONTROL:	Downstream Weir, upstream diversion and concrete lined, trapezoidal channel.
EQUIPMENT:	Stevens A-71 remote registering water-stage recorder at concrete weir, and ALERT rain gage with wind speed and direction sensor.
PERIOD OF RECORD:	January 1963 to present
REMARKS:	Flow regulated by Villa Park Dam and Santiago Reservoir. In addition to the outlet gate discharges and spilling flows, amounts reported include evaporation from the reservoir, seepage losses, and water flowing through the discharge pipeline controlled by the Serrano Water District.
RATING CURVE ACCURACY:	Excellent

PUBLIC FACILITIES AND RESOURCES DEPARTMENT

214

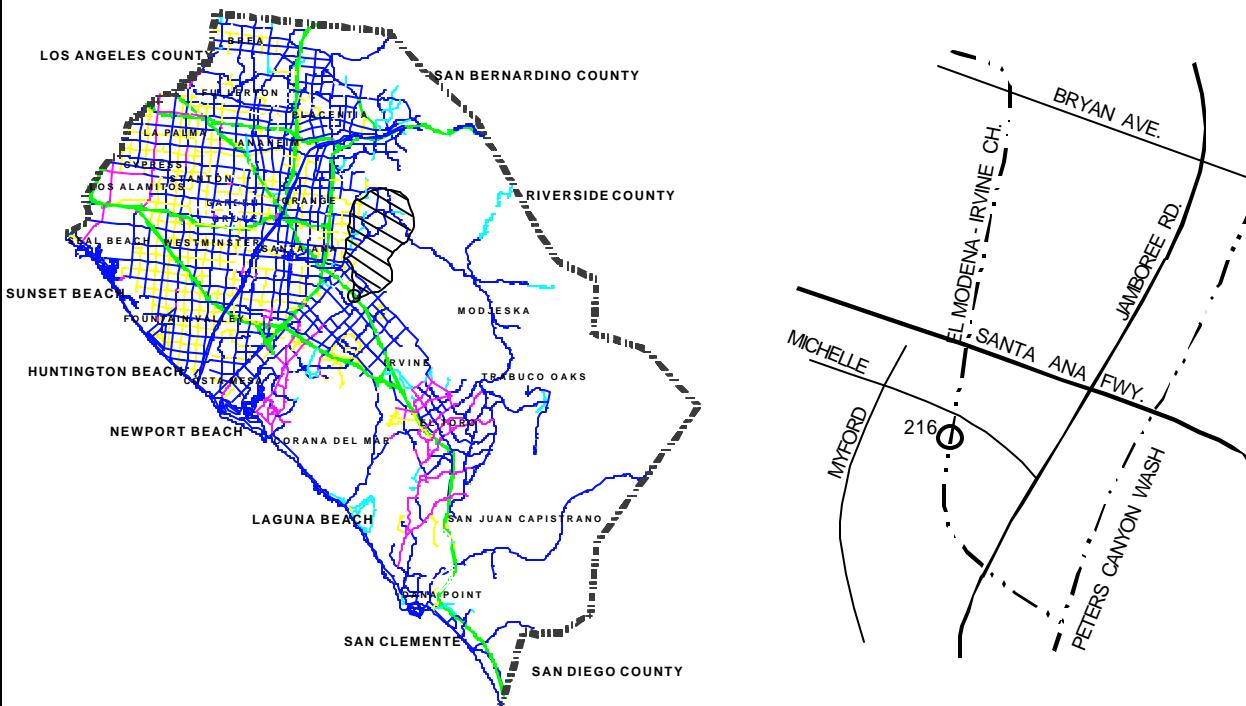
Santiago Creek at Villa Park Dam

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	18	21	23	20	24	0	0	0	0	0	0	15
2	18	22	22	19	25	0	0	0	0	0	0	12
3	17	22	21	19	26	0	0	0	0	0	0	18
4	18	22	21	19	18	0	0	0	0	0	0	15
5	17	22	21	20	.24	0	0	0	0	0	0	15
6	17	22	20	21	.24	0	0	0	0	0	0	15
7	18	22	20	21	.24	0	0	0	0	0	0	18
8	18	22	20	21	.24	0	0	0	0	0	0	21
9	20	22	20	21	.15	0	0	0	0	0	0	24
10	20	22	20	20	.10	0	0	0	0	0	0	17
11	19	22	21	20	0	0	0	0	0	0	0	8.5
12	19	22	22	20	0	0	0	0	0	0	0	0
13	18	19	21	20	0	0	0	0	0	0	0	0
14	18	18	22	19	0	0	0	0	0	0	0	0
15	18	18	21	12	0	0	0	0	0	0	.50	0
16	18	19	21	12	0	0	0	0	0	0	.48	0
17	18	18	19	20	0	0	0	0	0	0	.48	14
18	18	19	19	20	0	0	0	0	0	0	4.8	23
19	18	19	20	20	0	0	0	0	0	0	14	16
20	18	19	20	14	0	0	0	0	0	0	14	9.7
21	18	19	19	20	0	0	0	0	0	0	12	13
22	18	19	19	21	0	0	0	0	0	0	12	5.6
23	18	19	19	22	0	0	0	0	0	0	11	.43
24	19	13	20	23	0	0	0	0	0	0	10	.01
25	20	1.2	21	23	0	0	0	0	0	0	12	.15
26	21	6.4	20	23	0	0	0	0	0	0	14	.52
27	21	19	20	23	0	0	0	0	0	0	14	.65
28	21	17	20	23	0	0	0	0	0	0	13	1.3
29	21	18	19	23	0	0	0	-----	0	0	15	1.2
30	21	18	20	23	0	0	0	-----	0	0	16	1.5
31	21	19	-----	23	-----	0	0	-----	0	-----	16	-----
TOTAL	582	580.6	611	625	94.21	0	0	0	0	0	179.26	265.56
MEAN	18.8	18.7	20.4	20.2	3.14	0	0	0	0	0	5.78	8.85
MAX	21	22	23	23	26	0	0	0	0	0	16	24
MIN	17	1.2	19	12	0	0	0	0	0	0	0	0
AC-FT	1,150	1,150	1,210	1,240	187	0	0	0	0	0	356	527
CAL YEAR 1998 TOTAL		14,531.20	MEAN	39.8	MAX	2,640	MIN	0	AC-FT	28,820		
WTR YEAR 1999 TOTAL		2,937.63	MEAN	8.05	MAX	26	MIN	0	AC-FT	5,830		

Figure 16

EL MODENA-IRVINE CHANNEL AT MICHELLE STATION NO. 216



LOCATION:	Latitude $33^{\circ} 43' 12''$, Longitude $117^{\circ} 47' 54''$. On the right bank approximately 100 feet upstream of the Michelle Ave. Bridge.
DRAINAGE AREA:	11.9 sq. mi. (31.0 km^2)
GAGE ELEVATION:	73 ft. (23.3 m) MSL
HYDRAULIC CONTROL:	Supercritical flow-concrete lined, rectangular channel.
EQUIPMENT:	Stevens A-71 water-stage recorder with Balanced Beam Manometer, ALERT rain gage and water level sensor.
PERIOD OF RECORD:	March 1967 to present
REMARKS:	The gaging station has been relocated twice: 1) in 1986 when the gage was moved several hundred feet upstream to the D/S right bank of the michelle street bridge and 2) in 1994 when the gage was moved 100 feet U/S to its present location.
RATING CURVE ACCURACY:	Good

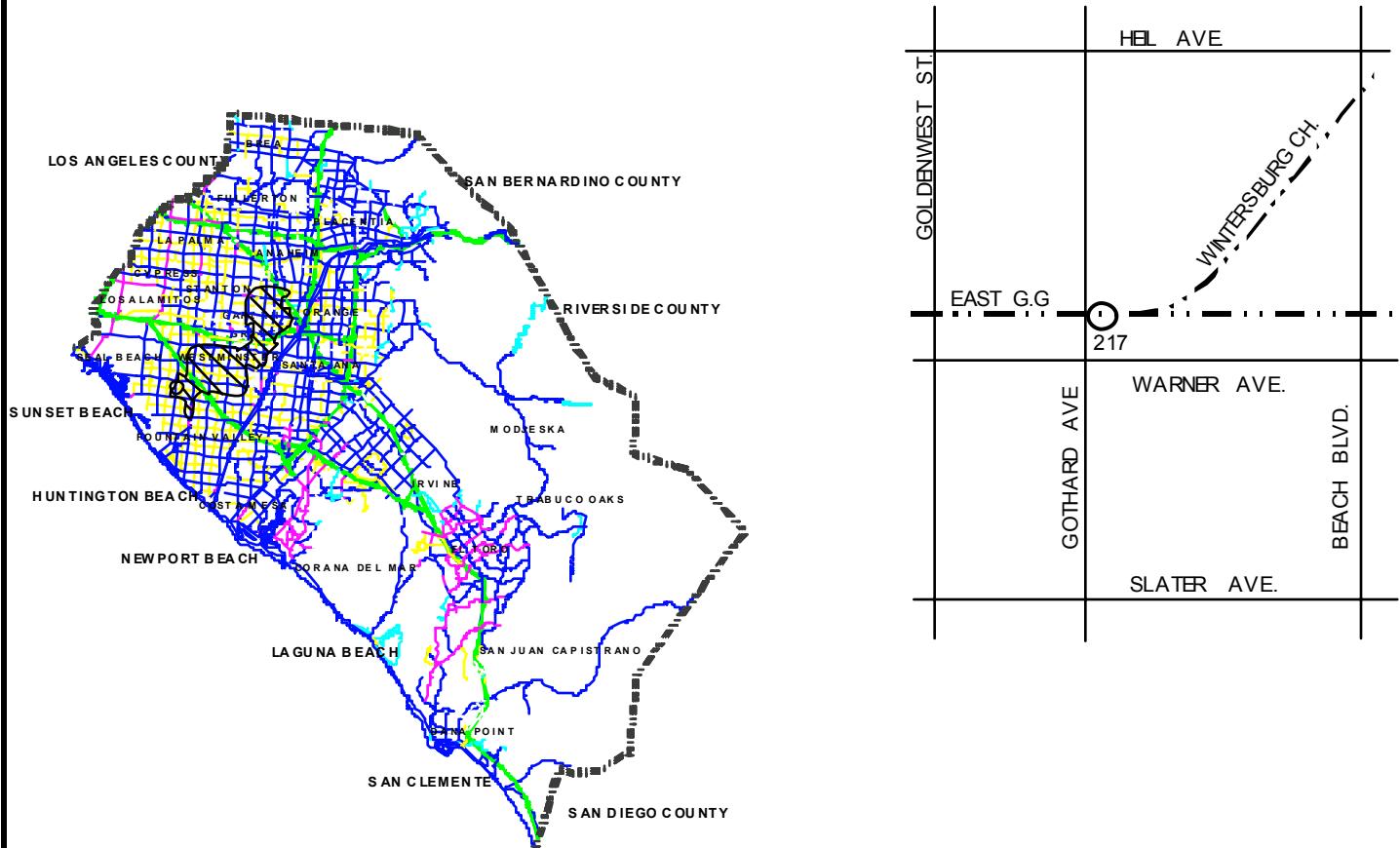
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
216 EL MODENA-IRVINE AT MICHELLE

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	1.8	1.8	1.9	1.8	2.2	28	1.2	1.2	1.6	1.0	1.2	1.5
2	1.8	1.9	2.0	1.8	2.2	2.4	1.2	1.2	1.5	.97	1.2	5.6
3	1.8	1.9	2.1	1.7	2.2	2.7	1.2	1.6	1.4	.93	1.2	2.3
4	1.9	1.9	2.1	1.7	2.3	2.8	1.2	3.1	1.3	.90	1.2	1.2
5	1.9	2.0	2.2	1.7	2.3	2.6	1.2	1.8	1.3	.89	1.2	1.3
6	1.9	2.1	2.2	1.7	2.3	13	1.1	1.1	1.2	12	1.2	1.2
7	1.9	2.1	2.2	1.7	91	4.1	1.1	.99	1.2	29	1.2	1.1
8	1.9	2.2	2.2	1.7	7.1	2.5	1.1	1.0	1.2	1.3	1.2	1.0
9	2.0	2.2	2.1	1.6	1.6	1.2	1.1	4.6	1.1	1.6	1.2	.96
10	2.1	2.2	2.1	1.4	1.3	1.2	1.1	1.3	1.1	1.4	1.4	.93
11	2.1	2.3	2.1	1.6	1.9	1.2	1.1	1.1	1.1	35	1.4	.95
12	2.1	2.3	2.1	1.5	1.9	1.2	1.1	1.0	1.1	32	1.4	.97
13	2.1	2.4	2.1	1.4	1.9	1.2	1.1	1.0	1.1	.85	1.4	.97
14	2.1	2.5	2.1	1.3	1.9	1.2	1.1	1.0	1.1	.84	1.4	1.0
15	2.1	2.5	2.1	1.3	1.8	1.2	1.1	1.0	1.1	.88	1.4	1.0
16	2.0	2.5	2.1	1.4	1.8	1.2	1.1	1.0	1.0	.93	1.4	1.0
17	1.9	2.3	2.1	1.6	1.8	1.1	1.1	1.0	1.0	.93	1.4	1.1
18	1.9	2.3	2.1	1.7	1.8	1.1	1.1	1.1	.97	.93	1.4	1.1
19	1.9	2.3	2.1	1.8	1.8	1.4	1.1	1.1	.93	.97	1.4	1.1
20	1.9	2.3	2.1	1.9	1.7	1.0	1.2	1.1	.93	.97	1.4	1.1
21	1.9	2.2	2.1	1.7	1.7	1.1	1.2	1.2	.93	1.0	1.4	1.1
22	1.9	2.2	2.0	1.7	1.6	1.1	1.1	1.2	.88	1.2	1.4	1.1
23	1.9	2.2	1.9	1.6	1.3	1.2	1.1	1.2	.88	1.2	1.5	1.1
24	1.9	2.2	1.9	1.6	1.3	1.2	1.1	1.2	.88	1.2	1.6	1.0
25	1.8	2.1	1.9	1.6	1.4	1.4	17	1.3	51	1.2	1.6	1.0
26	1.8	2.1	1.9	1.2	1.5	1.1	59	1.4	1.1	1.2	1.6	1.0
27	1.8	2.1	1.9	1.2	1.6	1.1	4.3	1.4	1.1	1.2	1.6	1.1
28	1.8	2.1	1.9	1.2	21	1.1	1.8	1.5	1.0	1.2	1.5	1.1
29	1.8	1.9	2.0	1.6	3.2	1.2	1.2	-----	1.0	1.2	1.3	1.1
30	1.9	1.9	2.1	1.6	2.8	1.2	1.2	-----	1.0	1.2	1.3	1.1
31	2.1	2.0	-----	1.6	-----	1.2	18	-----	1.0	-----	1.3	-----
TOTAL	59.7	67.0	61.7	48.9	170.2	85.2	129.6	38.69	84.00	136.09	42.3	38.08
MEAN	1.93	2.16	2.06	1.58	5.67	2.75	4.18	1.38	2.71	4.54	1.36	1.27
MAX	2.1	2.5	2.2	1.9	91	28	59	4.6	51	35	1.6	5.6
MIN	1.8	1.8	1.9	1.2	1.3	1.0	1.1	.99	.88	.84	1.2	.93
AC-FT	118	133	122	97	338	169	257	77	167	270	84	76
CAL YEAR 1998 TOTAL	3,924.62	MEAN	10.8	MAX	417	MIN	.52	AC-FT	7,780			
WTR YEAR 1999 TOTAL	961.46	MEAN	2.63	MAX	91	MIN	.84	AC-FT	1,910			

Figure 17

**EAST GARDEN GROVE-WINTERSBURG CHANNEL
STATION NO. 217**



LOCATION: Latitude $33^{\circ} 42' 58''$, Longitude $117^{\circ} 59' 57''$. Mid-channel downstream of Gothard St. adjacent to Gothard St. bridge.

DRAINAGE AREA: 20.8 sq. mi. (53.8 km^2) including 2.8 sq. mi. above Haster Retarding Basin and 0.50 mi. above West Street Retarding Basin.

GAGE ELEVATION: 25.0 ft. (7.60 m) MSL

HYDRAULIC CONTROL: Subcritical flow - trapezoidal, rip rap/earthen channel and tidal backwater.

EQUIPMENT: Stevens A-71 water-stage recorder with float, ALERT rain gage and water level sensor.

PERIOD OF RECORD: December 1967 to present

REMARKS: Flow affected by Retarding Basins which are located upstream of gage.

**RATING CURVE
ACCURACY:** Good

PUBLIC FACILITIES AND RESOURCES DEPARTMENT

217

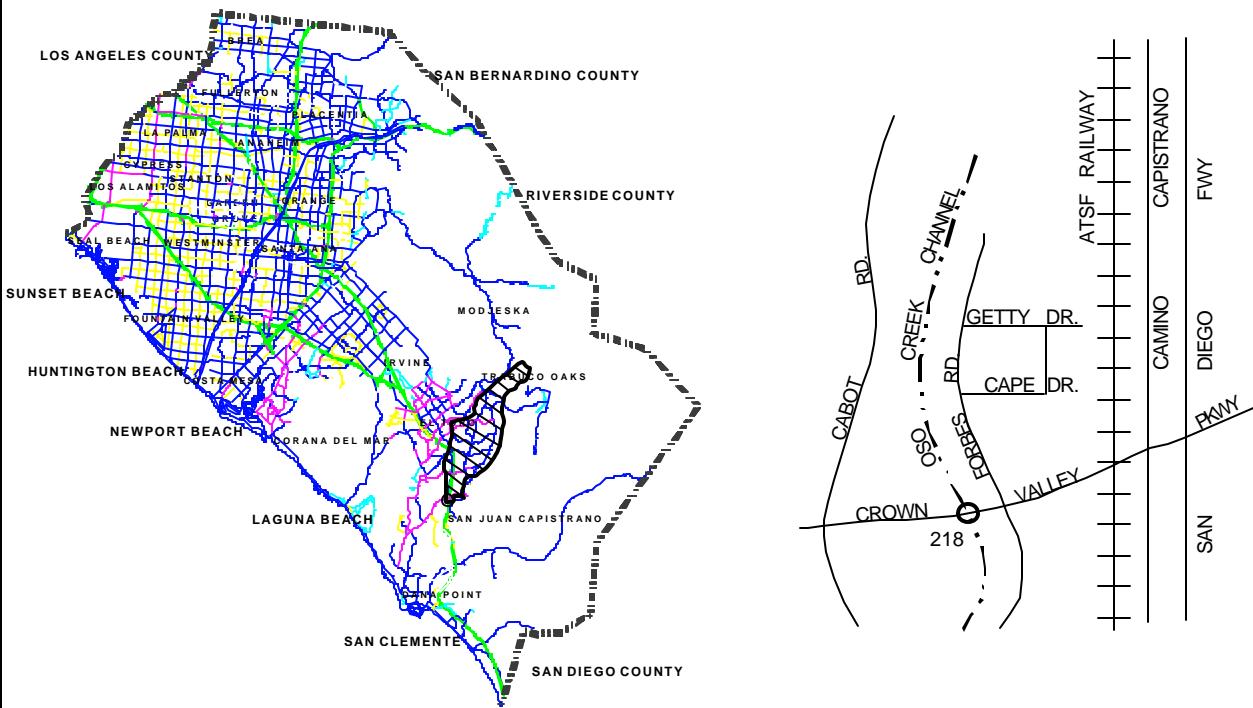
EAST GARDEN GROVE-WINTERSBURG AT GOTTHARD

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	12	12	11	10	10	63	8.4	19	9.4	6.9	12	8.3
2	11	11	11	10	10	29	8.4	17	8.4	6.7	9.7	36
3	11	11	11	10	10	18	8.4	19	7.5	6.4	13	16
4	11	11	10	10	10	18	7.8	20	9.1	6.6	14	10
5	11	12	10	10	10	19	9.0	59	7.3	7.1	15	7.3
6	11	11	10	10	10	72	11	11	7.3	52	12	7.3
7	11	11	10	10	10	22	10	7.3	7.3	73	11	7.1
8	11	11	10	10	279	17	8.4	7.5	7.4	21	11	7.0
9	11	10	10	10	46	16	8.4	25	8.1	21	14	6.8
10	11	10	10	10	24	12	8.4	19	8.8	10	11	6.5
11	11	11	10	10	17	10	8.4	7.8	21	176	13	6.3
12	11	11	10	10	17	10	8.4	6.3	11	88	10	6.0
13	11	11	10	10	16	9.3	7.8	6.5	8.5	27	13	5.9
14	15	11	10	10	16	8.4	7.8	6.9	7.6	19	12	5.6
15	12	10	10	10	16	8.4	7.8	7.4	88	16	11	6.4
16	11	10	10	10	16	8.4	8.4	7.5	20	14	9.3	7.5
17	11	10	11	10	17	8.4	8.4	6.2	15	12	11	7.7
18	11	12	11	10	17	8.4	9.3	5.9	11	10	11	7.6
19	11	55	10	10	18	30	11	6.0	8.5	9.5	9.4	7.4
20	10	9.5	10	10	18	25	40	6.5	25	11	11	7.7
21	17	15	10	10	18	9.5	19	6.7	11	9.4	9.8	8.1
22	12	11	10	10	18	9.1	11	6.6	7.9	10	9.0	8.7
23	12	10	10	10	18	9.6	9.7	6.3	8.1	11	11	9.3
24	11	10	10	11	18	10	9.9	8.0	7.6	8.6	9.9	9.8
25	11	10	10	11	20	8.5	121	6.9	100	8.4	8.8	10
26	11	10	10	11	19	8.2	61	7.1	32	9.2	8.0	10
27	11	10	10	10	19	8.9	51	7.4	14	9.2	9.8	11
28	12	11	10	10	73	9.6	20	7.6	9.4	10	7.9	11
29	12	12	10	10	21	9.3	16	-----	7.7	9.4	8.2	10
30	11	12	10	10	18	10	12	-----	8.0	10	8.5	8.7
31	11	12	-----	10	-----	8.1	100	-----	8.0	-----	8.2	-----
TOTAL	356	383.5	305	313	829	513.1	636.1	327.4	509.9	688.4	332.5	277.0
MEAN	11.5	12.4	10.2	10.1	27.6	16.6	20.5	11.7	16.4	22.9	10.7	9.23
MAX	17	55	11	11	279	72	121	59	100	176	15	36
MIN	10	9.5	10	10	10	8.1	7.8	5.9	7.3	6.4	7.9	5.6
AC-FT	706	761	605	621	1,640	1,020	1,260	649	1,010	1,370	660	549
CAL YEAR 1998 TOTAL		10,735.9	MEAN	29.4	MAX	546	MIN	6.9	AC-FT	21,290		
WTR YEAR 1999 TOTAL		5,470.9	MEAN	15.0	MAX	279	MIN	5.6	AC-FT	10,850		

Figure 18

OSO CREEK AT CROWN VALLEY PARKWAY STATION NO. 218



LOCATION:	Latitude $33^{\circ}33' 29''$, Longitude $117^{\circ}40' 33''$. On the right bank approximately 1200 ft. west of the intersection of Crown Valley Parkway and San Diego Freeway.
DRAINAGE AREA:	14.0 sq. mi. (36.2 km^2)
GAGE ELEVATION:	250 ft. (76.0 m) MSL
HYDRAULIC CONTROL:	Downstream critical depth control and supercritical and subcritical flow trapezoidal, rip rap/earthen channel.
EQUIPMENT:	Stevens A-71 water-stage recorder with float, ALERT rain gage and water level sensor.
PERIOD OF RECORD:	December 1969 to present
REMARKS:	A grouted rock structure about 130 ft. downstream of the gage serves as the control for low to medium-high stages.
RATING CURVE ACCURACY:	Fair

PUBLIC FACILITIES AND RESOURCES DEPARTMENT
 218 OSO CREEK AT CROWN VALLEY PARKWAY

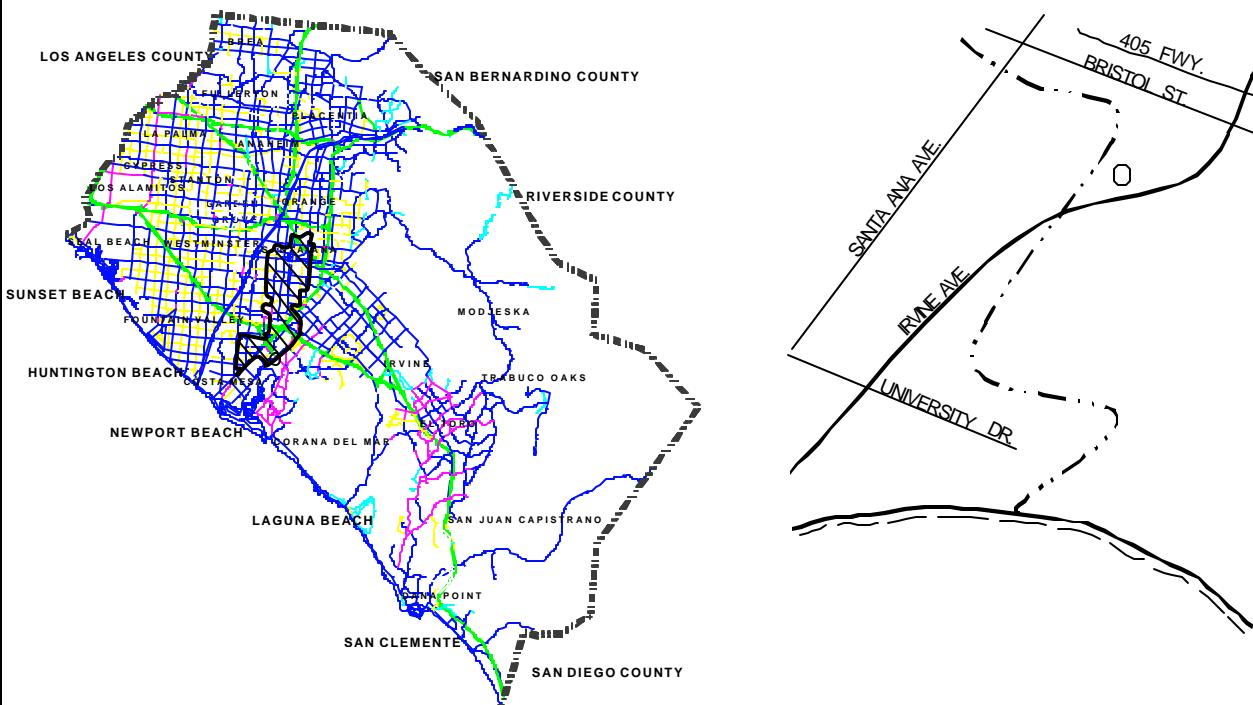
DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	3.8	0	0	1.1	1.3	39	5.0	6.3	4.7	4.2	4.5	4.9
2	3.3	0	0	1.0	1.5	6.3	5.0	4.4	4.7	5.0	4.6	11
3	3.0	0	41	1.0	1.8	5.4	5.0	5.0	4.7	5.0	4.7	5.0
4	2.6	0	5.3	1.0	2.0	9.9	5.0	11	7.7	4.8	4.8	5.0
5	2.4	0	3.2	1.0	2.1	11	4.7	7.6	5.7	4.7	5.0	4.8
6	2.1	0	2.8	1.0	2.4	48	4.7	4.2	5.5	12	5.0	4.7
7	1.9	0	2.5	1.0	2.7	4.7	4.7	4.2	5.3	63	4.9	4.7
8	1.7	0	2.3	.98	61	4.9	4.7	4.5	5.0	5.1	4.7	4.7
9	1.9	0	2.1	.96	4.9	5.0	4.7	15	5.0	4.8	4.7	4.7
10	1.8	0	2.0	.96	4.5	4.9	4.7	7.2	5.0	3.8	4.6	4.7
11	1.7	0	2.0	.93	4.5	4.6	4.9	5.7	5.3	44	4.5	4.7
12	1.6	0	1.9	.92	4.6	4.3	5.0	5.1	4.6	38	4.5	4.7
13	1.4	0	1.8	.92	4.5	4.2	5.0	4.7	4.9	3.9	4.5	4.6
14	1.2	0	1.7	.88	4.5	4.2	5.3	4.7	5.1	3.3	4.5	4.5
15	1.2	0	1.6	.87	4.7	4.0	5.3	4.7	25	3.3	4.5	4.5
16	1.2	0	1.5	.87	4.7	4.0	5.3	4.7	6.7	3.3	4.5	5.0
17	1.2	0	1.3	.84	4.9	4.0	5.3	5.0	5.1	3.2	4.5	5.0
18	1.1	0	1.2	.85	4.7	4.1	5.3	5.0	5.1	3.2	4.5	4.7
19	1.1	0	1.2	.86	4.7	11	5.1	5.0	5.0	3.2	4.5	4.7
20	1.1	0	1.2	.87	5.0	10	11	5.0	6.2	3.4	4.5	4.7
21	1.0	0	1.2	.87	5.0	4.7	6.5	5.0	5.0	3.6	4.5	4.7
22	1.0	0	1.2	.95	4.9	4.2	5.0	5.0	4.9	3.6	4.5	4.5
23	1.0	0	1.2	1.0	5.0	4.2	5.0	5.0	4.5	4.1	4.5	4.5
24	1.1	0	1.2	1.1	5.0	4.2	5.0	5.0	4.4	4.5	4.5	4.5
25	1.1	0	1.1	1.1	5.0	4.2	57	5.0	80	4.5	5.0	4.5
26	1.1	0	1.1	1.1	5.1	4.2	86	5.0	5.9	4.5	5.0	4.2
27	1.1	0	1.1	1.1	5.4	4.3	26	5.0	5.4	4.5	5.0	4.3
28	0	0	1.1	1.2	136	4.5	5.2	5.0	4.8	4.5	4.8	4.5
29	0	0	1.1	1.2	4.5	4.6	4.7	-----	4.4	4.5	4.7	4.5
30	0	0	1.1	1.2	4.1	4.9	4.7	-----	4.0	4.5	4.7	4.2
31	0	.01	-----	1.2	-----	11	32	-----	4.1	-----	4.7	-----
TOTAL	44.7	0.01	88.0	30.83	311.0	248.5	342.8	159.0	253.7	264.0	144.4	145.7
MEAN	1.44	0	2.93	.99	10.4	8.02	11.1	5.68	8.18	8.80	4.66	4.86
MAX	3.8	.01	41	1.2	136	48	86	15	80	63	5.0	11
MIN	0	0	0	.84	1.3	4.0	4.7	4.2	4.0	3.2	4.5	4.2
AC-FT	89	.02	175	61	617	493	680	315	503	524	286	289
CAL YEAR 1998 TOTAL	2,307.94	MEAN	6.32	MAX	305	MIN	0	AC-FT	4,580			
WTR YEAR 1999 TOTAL	2,032.64	MEAN	5.57	MAX	136	MIN	0	AC-FT	4,030			

NOTE: BASIN CONSTRUCTION UPSTREAM OF GAGING STATION
 AUGUST 28-NOVEMBER 1

Figure 19

SANTA ANA-DELHI CHANNEL AT IRVINE STATION NO. 220



LOCATION:	Latitude $33^{\circ} 39' 36''$, Longitude $117^{\circ} 52' 49''$. On the left bank approximately 600 ft. upstream of Irvine Avenue.
DRAINAGE AREA:	17.6 sq. mi (45.6 km ²)
GAGE ELEVATION:	21.8 ft. (6.6 m) MSL
HYDRAULIC CONTROL:	Subcritical flow - rectangular, concrete channel with V-bottom.
EQUIPMENT:	Stevens A-71 water-stage recorder with Balanced Beam Manometer and ALERT rain gage and water level sensor.
PERIOD OF RECORD:	December 1, 1989. Additional records available for location 600 ft downstream for the period 1971 to 1986.
REMARKS:	Discharge data required for sediment TMDL compliance program
RATING CURVE ACCURACY:	Good

PUBLIC FACILITIES AND RESOURCES DEPARTMENT
220 SANTA ANA-DELHI CHANNEL AT IRVINE AVE.

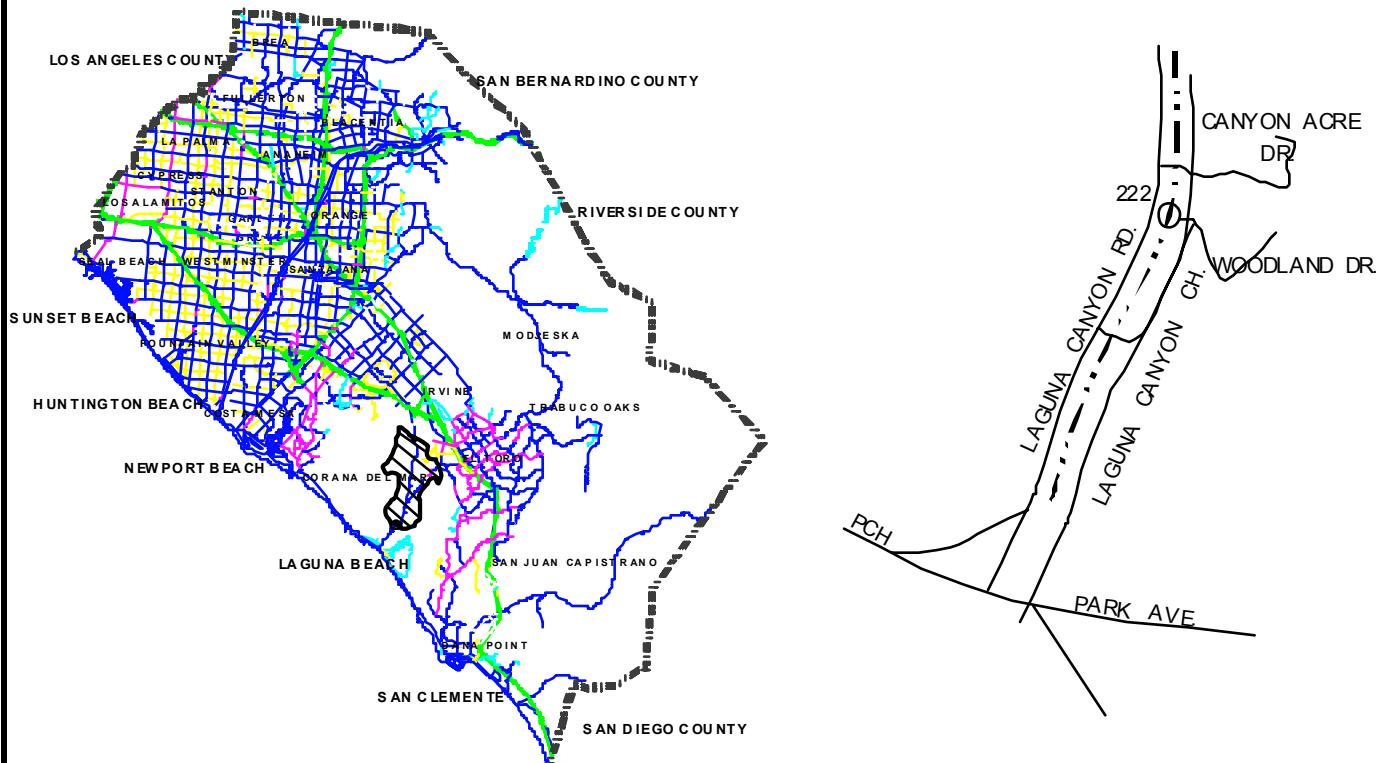
DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	.62	1.6	1.4	.59	1.2	40	1.3	.94	2.4	2.6	2.2	1.7
2	.61	1.2	1.1	.69	1.1	6.0	1.7	.60	1.9	2.8	1.4	12
3	.62	1.1	1.1	.65	1.1	1.4	1.5	.66	2.0	2.2	1.4	4.4
4	.62	.97	.95	.57	1.2	4.3	1.5	2.4	1.9	2.0	1.9	2.2
5	.61	.85	.85	.52	1.3	18	1.6	13	1.8	2.2	1.5	2.5
6	.61	.96	.93	.58	1.1	27	1.3	1.5	1.8	23	1.4	2.6
7	.62	.84	.61	.74	.81	1.5	1.6	1.1	3.6	55	1.3	3.1
8	.65	.88	.57	.54	165	1.1	1.5	1.0	3.1	5.9	1.4	3.2
9	.70	.92	.57	1.0	1.1	.90	1.3	6.3	2.7	8.2	1.5	2.5
10	.79	.85	.51	.51	.71	.95	1.2	3.0	2.4	3.8	1.5	2.1
11	.88	.81	.42	.52	2.1	1.2	1.3	1.2	7.3	95	1.5	2.0
12	.94	.68	.60	.56	.71	.82	1.1	1.2	5.6	48	1.5	2.1
13	1.1	.76	.55	.49	.61	.82	.57	1.2	3.7	3.6	1.5	1.8
14	1.2	.78	.69	.52	.70	.79	.61	1.2	2.4	2.9	1.4	2.2
15	1.2	.90	.76	.52	.79	.68	.62	1.1	30	3.0	1.4	1.8
16	1.4	.92	.65	.46	.64	.70	.59	1.1	4.4	2.6	1.5	1.8
17	1.4	.99	.61	.50	.61	1.0	.57	.75	3.1	2.5	1.6	2.0
18	1.3	1.6	.70	.63	.70	1.4	.53	.82	2.4	2.6	1.7	2.2
19	1.3	1.2	.74	.62	1.7	3.4	.52	.94	2.1	2.2	1.8	2.0
20	1.4	1.2	.87	.67	.85	6.4	7.4	.95	5.3	2.4	2.0	2.5
21	1.3	1.1	1.0	.76	.70	1.9	1.1	.94	2.4	2.5	2.4	2.5
22	1.4	1.1	.79	.82	.81	1.5	.54	1.1	2.1	2.4	2.3	2.7
23	1.3	1.0	.68	.96	.72	1.4	.56	1.3	2.7	2.7	2.1	2.9
24	1.2	1.2	.55	.90	1.1	1.4	.46	1.6	5.2	2.8	2.7	3.1
25	1.2	1.1	.59	2.4	.72	1.6	35	1.9	118	2.3	2.0	3.5
26	1.2	1.1	.62	.99	.88	1.8	71	1.9	9.4	2.0	1.3	3.2
27	1.3	1.1	.62	1.0	1.0	1.7	27	1.8	3.6	2.8	.86	3.8
28	1.3	1.0	.67	.98	37	1.6	.89	2.2	2.5	5.9	.90	4.0
29	2.0	.99	.64	1.1	2.3	1.9	.78	-----	1.9	11	.93	3.7
30	1.1	.71	.56	1.2	.98	1.5	.83	-----	2.2	8.2	1.1	3.8
31	1.2	2.1	-----	1.2	-----	1.4	64	-----	2.7	-----	1.3	-----
TOTAL	33.07	32.51	21.90	24.19	230.24	136.06	230.47	53.70	242.6	315.1	49.29	89.9
MEAN	1.07	1.05	.73	.78	7.67	4.39	7.43	1.92	7.83	10.5	1.59	3.00
MAX	2.0	2.1	1.4	2.4	165	40	71	13	118	95	2.7	12
MIN	.61	.68	.42	.46	.61	.68	.46	.60	1.8	2.0	.86	1.7
AC-FT	66	64	43	48	457	270	457	107	481	625	98	178
CAL YEAR 1998 TOTAL	6,460.85	MEAN	17.7	MAX	584	MIN	.42	AC-FT	12,820			
WTR YEAR 1999 TOTAL	1,459.03	MEAN	4.00	MAX	165	MIN	.42	AC-FT	2,890			

Figure 20

LAGUNA CANYON CHANNEL AT WOODLAND

STATION NO. 222



LOCATION: Latitude $33^{\circ} 33' 05''$, Longitude $117^{\circ} 48' 00''$. On the left bank of Laguna Canyon Channel 25 ft. upstream of Woodland Drive Bridge.

DRAINAGE AREA: 8.3 sq. mi. (21.4 km^2)

GAGE ELEVATION: 67 ft. (20.4 m) MSL

HYDRAULIC CONTROL: Supercritical flow - rectangular, concrete channel with V-bottom.

EQUIPMENT: Stevens A-71 water-stage recorder with float, ALERT rain gage and water level sensor.

PERIOD OF RECORD: November 1971 to present

REMARKS: No regulation or diversion above gage.

ACCURACY: Good

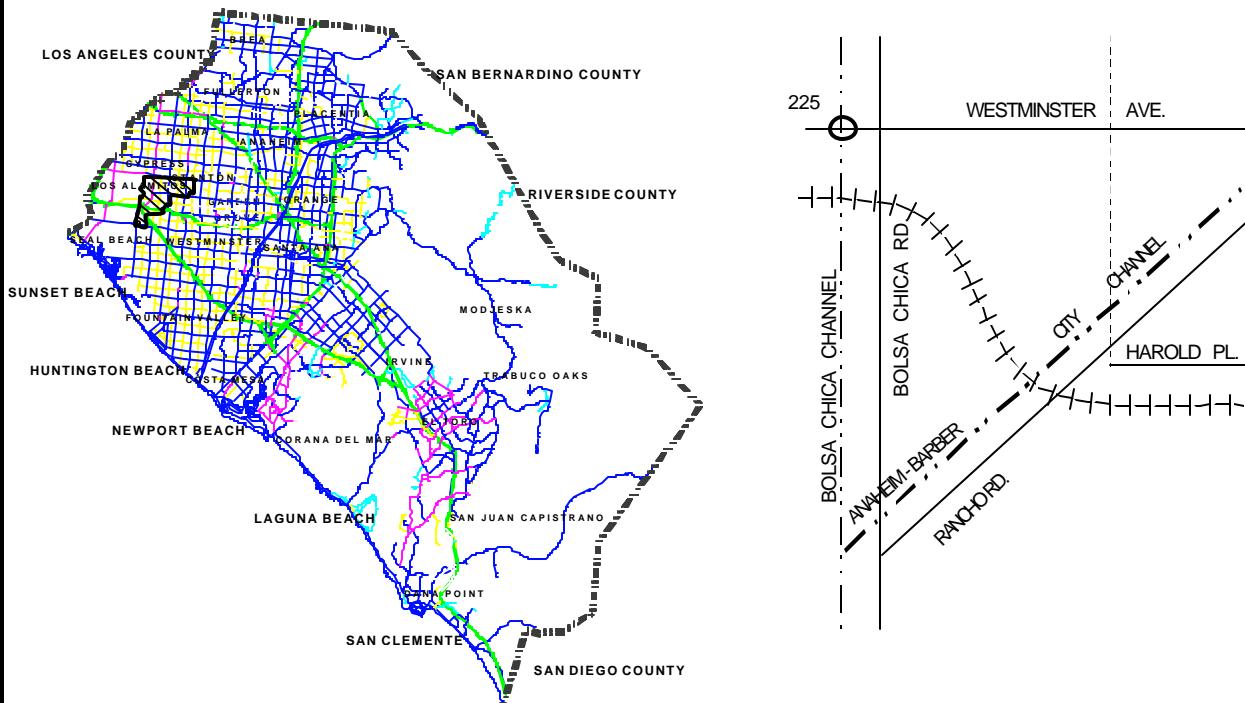
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
222 LAGUNA CANYON CHANNEL AT WOODLAND

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	.68	.75	.55	.74	.53	.87	.79	1.4	1.0	.53	.45	.59
2	.79	.74	.64	.74	.53	1.3	.71	.43	1.0	.53	.58	.57
3	.90	.78	3.5	.86	.20	4.5	.58	.63	1.3	.73	.63	.51
4	1.0	.87	2.8	.87	1.7	1.7	.54	.63	1.1	.74	.63	.45
5	.88	.87	.73	.79	1.4	3.7	.50	.72	.72	.74	.63	.49
6	1.0	.87	.34	.74	1.2	6.2	.42	.74	1.3	5.0	.53	.47
7	1.2	.87	.63	.75	.93	1.6	.39	.74	.94	8.5	.53	.47
8	.85	1.2	.63	.87	.70	.83	.36	.74	.63	1.7	.53	.51
9	.98	1.2	.53	.87	.63	.74	.79	.74	.81	1.4	.48	.50
10	1.1	1.1	.53	.87	.63	.87	.57	.74	.60	.62	.45	.53
11	.59	1.0	.25	.77	.63	.87	.40	.79	.44	2.6	.45	.47
12	.69	.97	.25	.74	.59	.96	.27	.87	.37	13	.45	.47
13	.74	.87	.16	.63	.53	1.0	.17	.87	.37	2.4	.49	.65
14	.62	.91	.81	.63	.53	1.0	.18	.87	.37	.76	.53	.70
15	.37	.84	1.3	.63	.53	.91	.42	.87	.42	.74	.55	.72
16	.37	.62	1.2	.63	.53	.80	.46	.87	.37	.63	.54	.58
17	.37	.90	1.1	.54	.45	.70	.50	.87	.37	.63	.53	.56
18	.50	1.3	.87	.45	.45	.61	.51	1.0	.37	.63	.73	.75
19	.45	1.0	.77	.45	.46	1.2	.54	.99	.35	.63	.74	1.0
20	.45	.81	.74	.79	.53	5.5	2.1	.87	.37	.56	.82	1.0
21	.63	.64	.74	.36	.53	2.5	.96	.87	.44	.63	.87	1.3
22	.58	.53	.85	.30	.53	.87	.51	.87	.50	.63	.88	1.2
23	.53	.49	.83	.31	.53	.87	.37	.87	.45	.72	.87	1.2
24	.53	.48	.74	.30	.54	1.0	.27	.95	.61	.63	.86	.87
25	.74	.46	.74	.27	.63	1.0	5.9	1.0	34	.72	.74	.87
26	.66	.45	.80	.25	.56	1.0	6.2	1.2	2.4	.32	.60	.87
27	.63	.44	.87	.45	.68	1.0	8.2	1.2	.81	.37	1.3	.63
28	.63	.46	.87	.45	12	.87	1.6	1.2	.73	.42	1.0	.63
29	.63	.51	.81	.45	2.9	.87	.41	-----	.54	.48	1.0	.63
30	.54	.69	.74	.44	.94	1.3	.27	-----	.48	.57	.83	.63
31	.53	.57	-----	.53	-----	1.3	3.1	-----	.45	-----	.74	-----
TOTAL	21.16	24.19	26.32	18.47	33.52	48.44	38.99	24.54	54.61	48.56	20.96	20.82
MEAN	.68	.78	.88	.60	1.12	1.56	1.26	.88	1.76	1.62	.68	.69
MAX	1.2	1.3	3.5	.87	12	6.2	8.2	1.4	34	13	1.3	1.3
MIN	.37	.44	.16	.25	.20	.61	.17	.43	.35	.32	.45	.45
AC-FT	42	48	52	37	66	96	77	49	108	96	42	41
CAL YEAR 1998 TOTAL	3,843.46	MEAN	10.5	MAX	319	MIN	.16	AC-FT	7,620			
WTR YEAR 1999 TOTAL	380.58	MEAN	1.04	MAX	34	MIN	.16	AC-FT	755			

Figure 21

BOLSA CHICA CHANNEL AT WESTMINSTER STATION NO. 225



LOCATION:	Latitude $33^{\circ} 45' 33''$, Longitude $118^{\circ} 02' 30''$. Beneath Westminster Ave.
DRAINAGE AREA:	10.0 sq. mi. (26.0 km^2)
GAGE ELEVATION:	5.0 ft. (1.50 m) MSL
HYDRAULIC CONTROL:	Subcritical flow - trapezoidal, rip rap/earthen channel and tidal backwater.
EQUIPMENT:	Stevens A-71 water-stage recorder with float and ALERT water level sensor.
PERIOD OF RECORD:	January 1976 to August 1985 @ Bolsa Avenue September 1985 to present at Westminster Ave.
REMARKS:	Due to a slight slope of the channel, tidal effects namely from high tides are of concern.
ACCURACY:	Fair

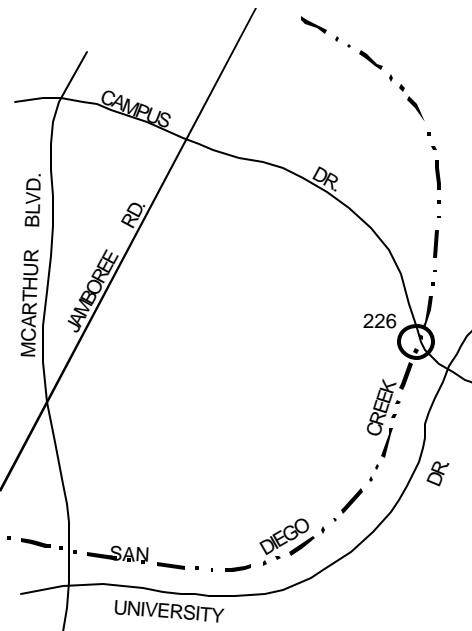
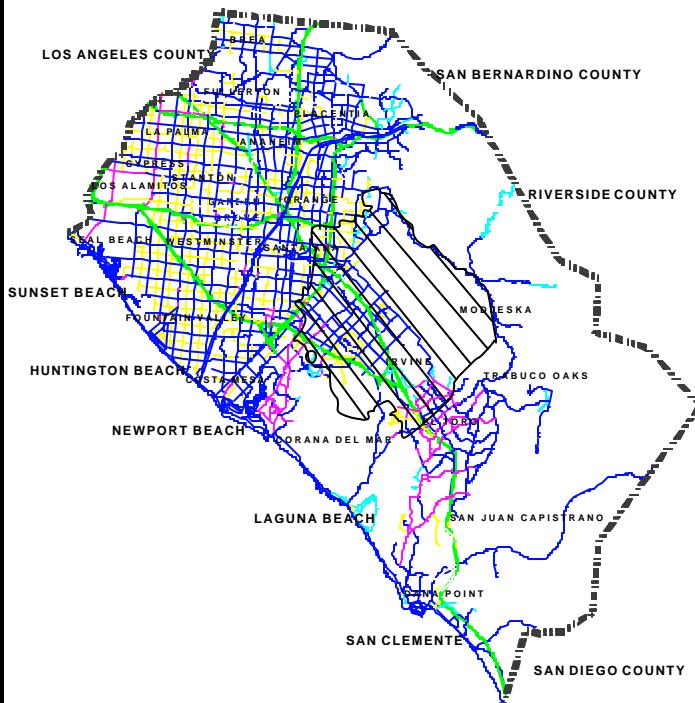
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
225 BOLSA CHICA CHANNEL AT WESTMINSTER BLVD.

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	.5	.6	.4	.2	.5	14.1	.3	.9	.3	1.7	.6	1.7
2	.6	.7	.6	.8	.4	7.4	.3	.7	.3	1.0	.6	46.4
3	.5	1.4	.5	.3	.3	.4	.2	.7	.4	1.1	.7	3.2
4	.3	1.1	.2	.3	.4	.7	.3	33.0	.4	.9	.8	1.8
5	.3	.8	.3	.4	.4	2.8	.4	19.8	.4	.7	.6	1.9
6	.3	1.3	.6	.6	1.4	28.5	.3	1.1	.3	27.6	.6	1.8
7	.6	1.1	1.0	.6	1.6	.4	.4	.8	.3	25.4	.6	1.4
8	.3	.9	.7	.6	157	.3	.4	.7	.3	1.9	.6	1.0
9	.3	.7	.5	.6	2.3	.3	.3	11.4	3.9	1.5	.6	.6
10	.2	.5	1.0	.6	1.8	.3	.4	1.9	.8	.4	.6	.7
11	.3	.5	3.0	.6	4.7	.5	.5	.6	5.2	119	.6	.6
12	.2	.5	.5	.6	1.1	.3	.5	.7	38.7	.6	.6	
13	.4	.5	.4	.6	.8	.3	.4	.7	2.1	.6	.5	
14	.4	.5	.6	.6	.7	.5	.2	.4	.7	1.5	.6	
15	.6	.5	.3	.6	.7	.5	.3	.4	61.3	2.0	.6	
16	.9	.5	.3	.6	.8	.3	.3	.4	2.3	1.5	.5	.4
17	.7	.5	.3	.6	.9	.4	.3	.3	1.0	1.2	.5	.4
18	.5	.5	.3	.6	.8	.4	.3	.3	.9	1.1	.5	.3
19	.5	.4	.3	.6	.6	9.4	.2	.3	.9	.9	.6	.3
20	.4	.9	.4	.6	.4	6.2	15.0	.2	10.5	1.0	1.0	.3
21	.5	.3	.4	.6	.4	.4	.8	.2	1.1	1.2	.5	.4
22	.4	.3	.3	.6	.4	.4	.3	.2	1.1	1.0	.5	.4
23	.6	.3	.4	.6	.5	.5	.2	.2	1.2	.8	1.0	.4
24	.6	.3	1.0	.6	.8	.5	.2	.2	1.1	.7	.8	1.0
25	.4	.7	.9	.5	.5	.4	26.0	.2	44.8	.7	1.0	.3
26	.6	.5	.5	.5	.5	.4	35.4	.2	4.2	.7	.7	.4
27	.5	.6	.5	.3	.4	.3	25.8	.2	1.6	.7	1.3	.5
28	1.6	.4	.4	.3	24.6	.3	4.9	.3	1.5	1.1	1.0	.5
29	.6	.5	1.0	.3	1.7	.4	.6	-----	1.7	.5	1.1	1.6
30	.7	.5	1.2	.3	.5	.4	.5	-----	1.8	.6	1.4	.8
31	.6	.5	-----	.4	-----	.3	42.1	-----	1.6	-----	1.4	-----
TOTAL	15.9	19.3	18.8	16.0	207.9	78.3	158.0	76.5	153.3	239.2	23.1	71.3
MEAN	.5	.6	.6	.5	6.9	2.5	5.1	2.7	4.9	8.0	.7	2.4
MAX	1.6	1.4	3.0	.8	157	28.5	42.1	33.0	61.3	119	1.4	46.4
MIN	.2	.3	.2	.2	.3	.3	.2	.2	.3	.4	.5	.3
AC-FT	31.5	38.3	37.3	31.7	412	155	313	152	304	474	45.8	141
CAL YEAR 1998 TOTAL		3,877.2	MEAN	10.6	MAX	398	MIN	.2	AC-FT	7,690		
WTR YEAR 1999 TOTAL		1,077.6	MEAN	3.0	MAX	157	MIN	.2	AC-FT	2,136		

Figure 22

SAN DIEGO CREEK AT CAMPUS STATION NO. 226



LOCATION:	Latitude $33^{\circ} 39' 20''$, Longitude $117^{\circ} 50' 41''$. On the right bank downstream of Campus Drive.
DRAINAGE AREA:	111 sq. mi (287.5 km ²).
GAGE ELEVATION:	45.0 ft. (13.7 m) MSL.
HYDRAULIC CONTROL:	Downstream critical depth control and subcritical flow - trapezoidal, earthen channel.
EQUIPMENT:	Stevens A-71 water-stage recorder with Balanced Beam Manometer, ALERT rain gage and water level sensor.
PERIOD OF RECORD:	August 1977 to present. Prior to 1986 the station was operated by USGS.
REMARKS:	Discharge data required for sediment TMDL compliance program.
RATING CURVE ACCURACY:	Good

PUBLIC FACILITIES AND RESOURCES DEPARTMENT
226 SAN DIEGO CREEK AT CAMPUS

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	12	15	14	16	13	348	12	21	14	11	14	17
2	9.4	15	16	15	13	36	12	14	14	12	14	58
3	9.7	14	18	17	13	7.4E	15	13	15	13	14	26
4	10	15	28	16	13	20	13	28	20	13	13	18
5	9.5	14	17	15	14	71	13	58	14	11	12	19
6	11	15	11	14	17	211	13	16	12	64	18	20
7	9.5	16	11	15	15	6.1E	15	14	15	161	15	18
8	7.8	16	11	18	452	4.8E	14	13	11	18	17	15
9	9.6	16	12	16	11	4.0E	13	38	10	32	17	15
10	14	15	12	18	7.8E	3.7E	13	35	11	11	15	16
11	11	15	13	17	8.8E	3.5E	14	15	24	200	14	17
12	10	16	13	16	7.7E	3.6E	14	14	13	297	13	18
13	10	15	14	17	7.2E	3.5E	13	15	11	15	17	19
14	11	16	14	19	7.3E	3.6E	14	15	10	11	14	20
15	9.4	14	14	19	7.4E	3.8E	14	16	93	11	16	19
16	9.6	13	14	17	7.7E	3.9E	13	16	15	11	17	18
17	11	14	15	17	7.5E	3.9E	13	16	9.5	11	18	18
18	11	13	18	17	7.7E	4.1E	12	16	9.6	12	18	19
19	10	14	18	16	7.9E	14	11	16	9.4	12	16	19
20	11	12	17	16	5.5E	24	44	16	16	12	15	18
21	12	15	17	16	3.7E	5.0E	21	17	12	13	16	17
22	15	15	19	15	4.0E	5.1E	15	15	9.0	15	17	17
23	13	14	19	16	4.1E	6.4E	13	15	10	16	21	17
24	16	13	19	16	4.1E	8.8E	12	16	10	17	19	17
25	1.7	13	19	24	4.1E	9.1E	284	16	405	18	18	18
26	16	16	18	14	4.0E	4.4E	361	16	29	16	17	18
27	14	15	18	13	3.9E	4.3E	302	15	11	16	21	17
28	16	16	18	14	237	4.5E	19	14	9.0	16	18	18
29	18	11	17	13	7.9E	4.3E	16	-----	8.8	14	16	19
30	15	11	20	13	3.9E	9.7E	14	-----	9.4	14	16	14
31	16	11	-----	12	-----	12	243	-----	9.7	-----	16	-----
TOTAL	374.5	443	484	497	920.2	853.5	1,595	529	869.4	1,093	502	579
MEAN	12.1	14.3	16.1	16.0	30.7	27.5	51.5	18.9	28.0	36.4	16.2	19.3
MAX	18	16	28	24	452	348	361	58	405	297	21	58
MIN	7.8	11	11	12	3.7	3.5	11	13	8.8	11	12	14
AC-FT	743	879	960	986	1,830	1,690	3,160	1,050	1,720	2,170	996	1,150
CAL YEAR 1998 TOTAL	34,384.9	MEAN	94.2	MAX	2,820	MIN	3.5	AC-FT	68,200			
WTR YEAR 1999 TOTAL	8,739.6	MEAN	23.9	MAX	452	MIN	3.5	AC-FT	17,330			

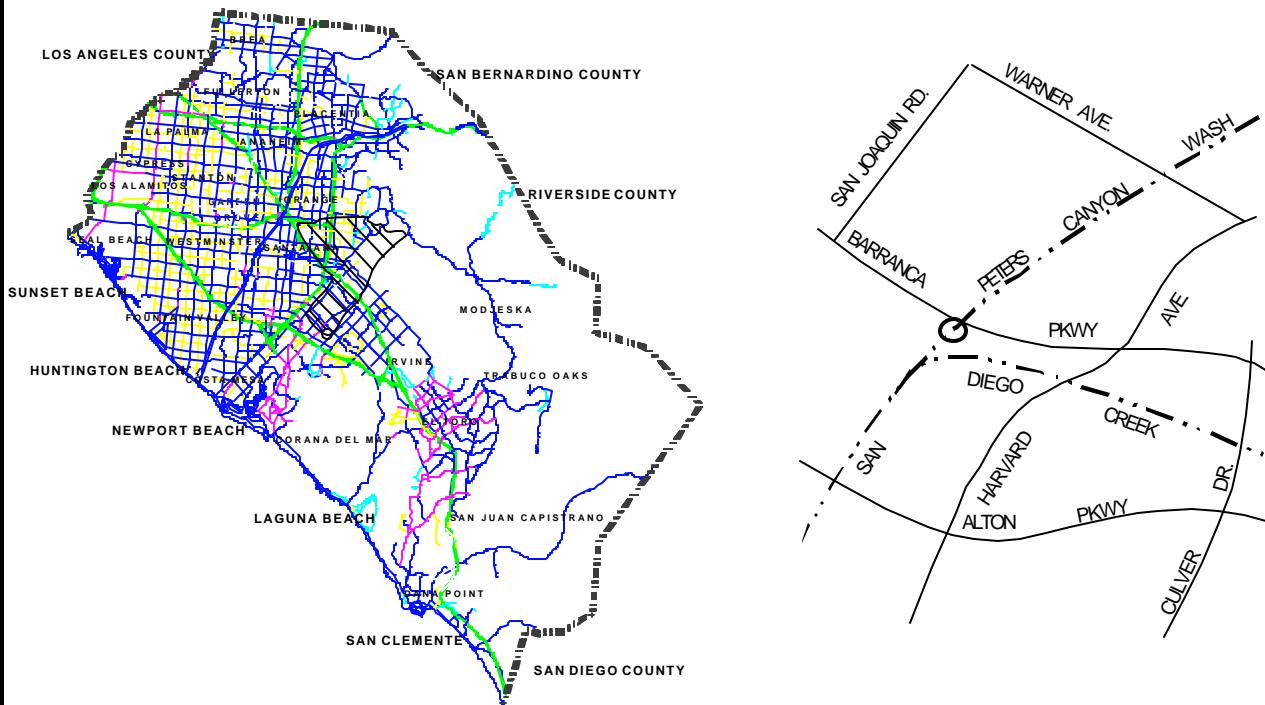
E = Estimated flow due to weir which diverted up to 50 percent of flow out of low-flow notch in November and December 1998

Note: Lower weir diverted up to 5 percent of low-flow during all of 1999

Figure 23

PETERS CANYON WASH AT BARRANCA

STATION NO. 230



LOCATION: Latitude $33^{\circ} 41' 29''$, Longitude $117^{\circ} 49' 23''$. On the right bank approximately 60.0 ft. downstream of Barranca Parkway Bridge.

DRAINAGE AREA: 45.2 sq. mi. (117 km²)

GAGE ELEVATION: 45.0 ft. (13.7 m) MSL

HYDRAULIC CONTROL: Subcritical flow - shifting low flow vegetation and confluence backwater.

EQUIPMENT: Stevens A-71 water-stage recorder with Balanced Beam Manometer, ALERT rain gage and water level sensor.

PERIOD OF RECORD: July 1985 to present

REMARKS: Low flow augmented by irrigation return. - Discharge data required for sediment TMDL compliance program.

RATING CURVE ACCURACY:

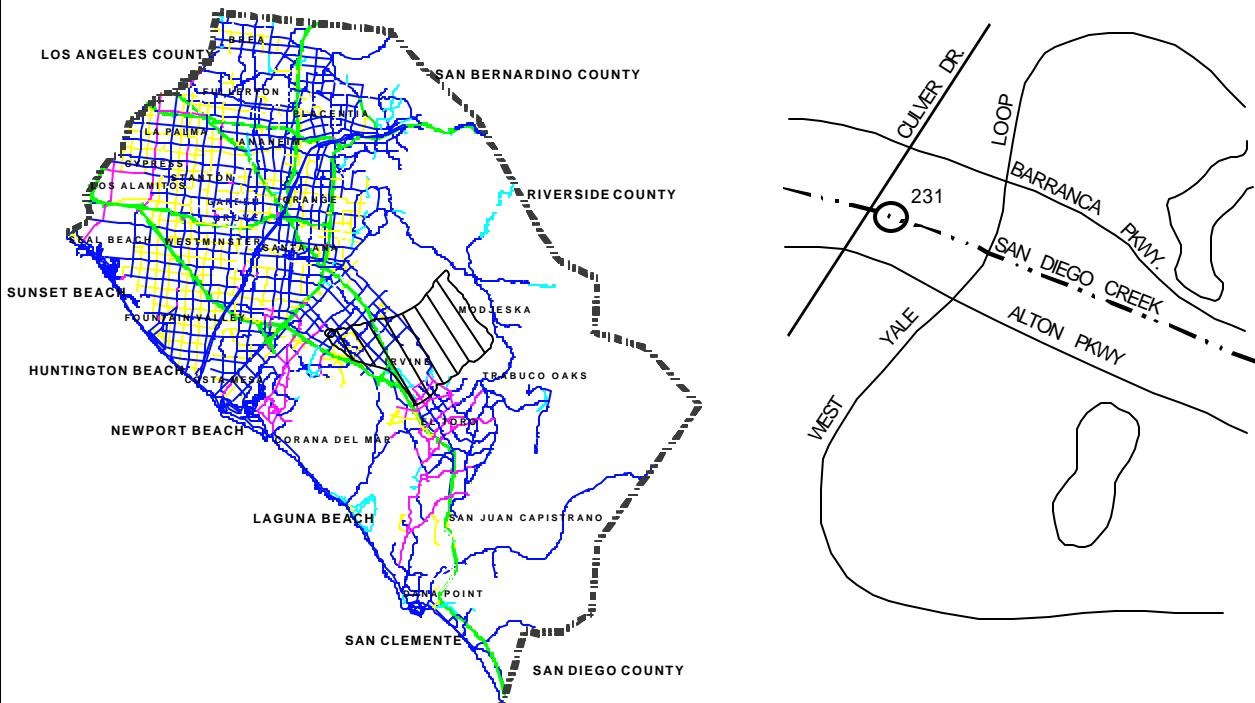
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
230 PETERS CANYON WASH AT BARRANCA PARKWAY

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	7.8	8.8	7.3	8.2	7.6	139	7.8	6.8	8.5	7.2	8.4	10
2	8.0	8.0	6.8	8.9	8.3	11	9.1	6.1	9.6	6.4	8.9	27
3	7.7	9.0	6.3	7.8	8.8	9.8	9.4	7.1	11	6.8	8.8	17
4	8.4	9.5	6.6	7.2	8.3	9.9	8.6	12	11	7.0	8.6	15
5	8.8	10	6.2	7.2	7.8	21	7.9	16	8.9	7.1	8.9	14
6	9.6	10	5.4	6.2	8.1	86	9.1	7.2	8.9	26	11	13
7	10	9.1	5.6	8.5	7.6	7.6	10	6.9	9.0	43	9.3	13
8	9.8	9.0	4.6	10	176 E	6.9	8.3	6.7	8.3	11	9.9	13
9	10	7.8	4.8	10	9.2	6.9	7.5	15	8.7	10	10	12
10	11	7.9	5.8	9.8	8.4	6.8	8.0	8.8	9.0	7.7	9.7	12
11	11	8.8	6.5	9.1	13	7.3	7.9	6.5	13	75	9.3	11
12	11	8.9	7.4	9.3	8.6	7.1	8.6	7.1	9.3	63	9.6	11
13	12	8.8	7.3	8.5	7.7	7.1	8.2	8.4	9.7	8.6	10	11
14	10	8.8	7.7	8.4	7.8	7.4	8.0	8.0	9.4	8.1	8.3	12
15	9.0	8.1	7.8	8.7	7.8	7.1	7.8	7.5	36	7.7	8.8	11
16	9.7	7.6	8.0	8.2	7.6	5.9	8.4	7.5	9.8	7.8	9.2	11
17	9.6	7.4	8.5	8.1	7.5	7.0	8.4	8.1	8.4	8.0	10	11
18	9.4	6.7	8.3	7.9	6.8	8.0	8.7	8.0	8.3	8.0	10	11
19	9.2	6.5	8.2	8.5	5.8	14	8.1	7.8	8.2	8.3	10	11
20	10	6.1	8.2	9.3	5.9	11	18	8.1	11	8.3	10	12
21	10	5.7	9.2	9.6	6.5	7.0	8.2	7.8	8.3	8.0	10	11
22	9.3	5.2	8.5	7.9	6.8	8.1	7.5	7.9	7.4	6.9	9.7	11
23	8.1	5.0	8.8	6.8	7.2	9.1	6.9	8.6	7.6	7.2	10	11
24	8.6	5.4	9.3	6.5	7.1	10	6.9	9.0	7.5	7.2	10	12
25	8.8	5.7	9.1	8.8	7.4	10	86	9.0	163 E	7.3	10	12
26	8.6	6.6	9.0	6.2	7.5	7.7	199	8.9	7.3	7.6	11	12
27	8.7	5.8	11	5.9	9.3	7.4	48	9.0	5.9	7.8	11	12
28	8.8	6.1	8.6	6.2	92	8.5	6.3	7.9	6.4	8.2	9.9	13
29	8.8	5.6	8.2	6.8	8.0	8.7	6.9	-----	7.1	7.6	8.8	13
30	8.5	5.2	9.6	6.7	6.5	8.3	6.2	-----	7.4	8.2	8.8	12
31	7.9	7.2	-----	7.5	-----	8.7	90	-----	7.7	-----	9.4	-----
TOTAL	288.1	230.3	228.6	248.7	486.9	480.3	649.7	237.7	451.6	411.0	297.3	377
MEAN	9.29	7.43	7.62	8.02	16.2	15.5	21.0	8.49	14.6	13.7	9.59	12.6
MAX	12	10	11	10	176	139	199	16	163	75	11	27
MIN	7.7	5.0	4.6	5.9	5.8	5.9	6.2	6.1	5.9	6.4	8.3	10
AC-FT	571	457	453	493	966	953	1,290	471	896	815	590	748
CAL YEAR 1998 TOTAL	14,101.6	MEAN	38.6	MAX	1,080	MIN	4.6	AC-FT	27,970			
WTR YEAR 1999 TOTAL	4,387.2	MEAN	12.0	MAX	199	MIN	4.6	AC-FT	8,700			

Figure 24

SAN DIEGO CREEK AT CULVER STATION NO. 231



LOCATION:	Latitude $33^{\circ} 40' 54''$, Longitude $117^{\circ} 48' 31''$. Approximately 150 ft. upstream of the Culver Drive bridge on the right bank and 200 feet from the drop structure and energy dissipater.
DRAINAGE AREA:	41.8 sq. mi. (108 km^2)
GAGE ELEVATION:	75.0 ft. (22.9 m) MSL
HYDRAULIC CONTROL:	Subcritical flow - shifting low flow vegetation and confluence backwater.
EQUIPMENT:	Stevens A-71 water-stage recorder with Pressure Transducer, chart drive recorder and ALERT water level sensor.
PERIOD OF RECORD:	January 1965 to present
REMARKS:	USGS operated prior to 1986. - Discharge data required for sediment TMDL compliance program.
RATING CURVE ACCURACY:	Good

PUBLIC FACILITIES AND RESOURCES DEPARTMENT
231 SAN DIEGO CREEK AT CULVER DRIVE

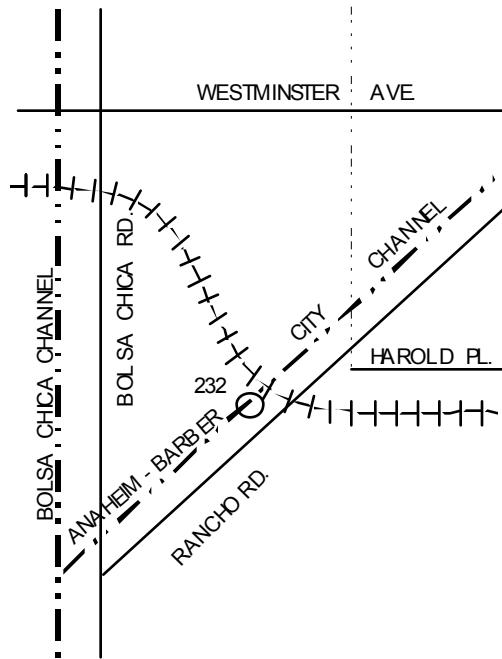
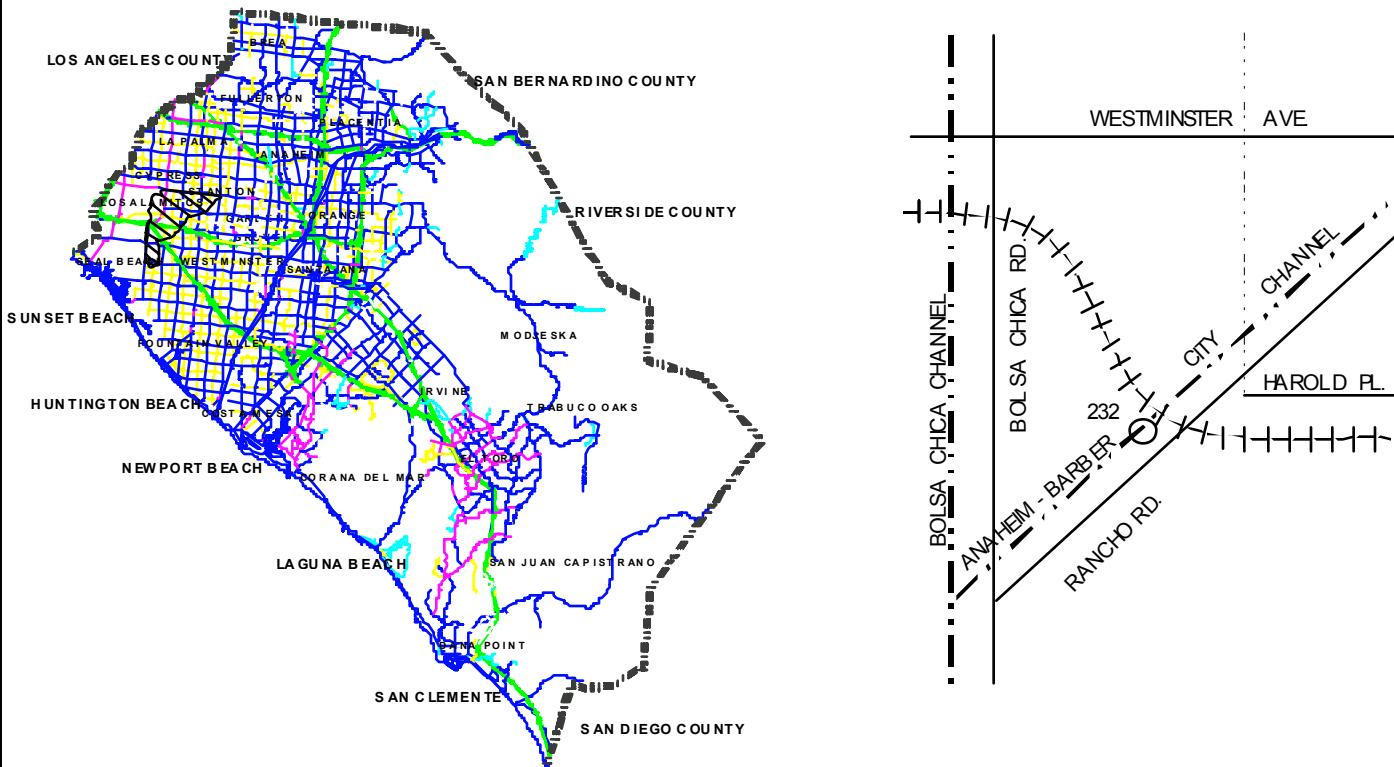
DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	2.4	1.1	2.8	3.5	8.0	40.7E	4.8E	9.6	3.7	2.5	2.0	4.7
2	2.8	1.0	2.5	3.5	8.8	3.4E	4.3E	4.9E	4.4	10.3E	2.4E	22.9
3	2.0	1.5	2.1	3.5	9.2	1.0E	4.5E	3.6	4.4	2.7E	3.3	16.0
4	2.3	1.6	1.9	4.1	10.4	2.9E	4.0E	40.6E	3.8	2.6E	4.2	10.2
5	2.5	1.7	2.1	4.2	10.3	22.1	3.8E	7.1	4.5	2.5E	4.2	10.3
6	2.7	1.3	1.9	4.0	4.8E	17.4	3.4E	5.0	5.1	32.3	4.2	9.4
7	2.9	.6	1.7	4.6	5.1E	.5E	3.3	4.9	5.7	127	4.1	2.9
8	2.7	.7	1.5	5.0	153 E	.6E	3.4	4.1	6.8	17.5	4.4	2.4
9	2.9	.9	1.3	5.3	24.5E	.3E	3.3	11.7	8.0	12.6	4.3	2.6
10	2.9	1.2	1.5	5.5	12.2E	.2E	3.2	3.1	9.5	1.1	4.4	2.7
11	3.1	1.6	1.4	5.0	7.3E	.3E	3.3	2.6	21.7E	122 E	4.3	2.6
12	3.0	1.5	1.7	5.3	4.6E	.7E	3.1	2.7	15.3	149 E	3.9	2.7
13	2.3	1.2	1.8	4.8	4.9E	.7E	2.2	2.8	19.1	6.0E	4.3	2.8
14	2.0	1.4	2.2	4.8	5.2E	.8E	2.5	2.9	23.9	1.4E	4.4	2.8
15	2.9	1.6	2.2	5.0	5.3E	2.5E	4.0	3.0	49.9	1.0E	4.9	2.9
16	2.8	1.6	2.1	5.1	5.6E	3.5E	4.8	3.2	4.5	.8E	5.4	2.6
17	2.2	1.6	2.4	4.3	5.8E	3.7E	5.0	2.3	2.8	1.1E	5.6	2.6
18	2.3	1.9	2.5	4.4	6.1E	3.9E	5.4	1.5	3.4	1.0E	5.2	2.4
19	2.1	2.6	2.8	4.5	5.9E	13.9E	5.0	1.6	3.8	1.0E	4.1	2.4
20	2.1	2.7	2.9	4.5	4.5E	7.6E	10.1	1.7	4.1	.8E	4.8	2.3
21	1.8	3.2	3.5	4.4	3.3E	4.1E	7.0	1.7	4.6	.6E	5.8	2.5
22	2.0	3.8	4.0	3.0	2.4E	4.4E	9.6	2.5	4.8	.6E	7.7	2.3
23	1.7	4.5	4.0	2.8	1.8E	4.6E	12.6	2.7	5.5	.7E	7.3	2.3
24	1.5	5.2	4.1	3.5	2.6E	4.8E	18.3	2.6	6.8	.6E	4.5	2.2
25	1.4	3.7	3.8	3.5	3.8E	4.8E	101	2.8	139	.7E	2.7	2.0
26	1.1	2.7	4.0	4.0	4.4E	5.0E	151	2.9	16.8	.7E	2.8	2.0
27	1.3	1.7	4.1	4.3	4.7E	5.2E	108 E	3.2	3.4	.8E	3.2	1.9
28	1.1	1.4	3.8	5.1	23.2E	5.6E	5.7E	3.4	1.9	.9E	3.6	2.0
29	.8	2.1	3.9	6.0	4.5E	5.3E	4.1E	-----	1.4	1.1E	3.8	1.9
30	1.1	2.3	3.8	5.9	.4E	5.7E	3.9E	-----	1.1	1.5E	4.0	1.8
31	1.5	3.6	-----	6.8	-----	5.0E	82.6	-----	1.4	-----	4.5	-----
TOTAL	66.2	63.5	80.3	140.2	352.6	181.2	587.2	140.7	391.1	503.4	134.3	131.1
MEAN	2.1	2.0	2.7	4.5	11.8	5.8	18.9	5.0	12.6	16.8	4.3	4.4
MAX	3.1	5.2	4.1	6.8	153	40.7	151	40.6	139	149	7.7	22.9
MIN	.8	.6	1.3	2.8	.4	.2	2.2	1.5	1.1	.6	2.0	1.8
AC-FT	131	126	159	278	699	359	1,165	279	776	998	266	260
CAL YEAR 1998 TOTAL	11,177.2	MEAN	30.6	MAX	1,180	MIN	.2	AC-FT	22,168			
WTR YEAR 1999 TOTAL	2,771.8	MEAN	7.6	MAX	153	MIN	.2	AC-FT	5,496			

E = ESTIMATED

Figure 25

ANAHEIM - BARBER CITY AT RANCH
STATION NO. 232



LOCATION: Latitude $33^{\circ} 45' 16''$, longitude $118^{\circ} 02' 04''$. Approximately 20 ft. downstream of U.S Government railroad bridge on right bank.

DRAINAGE AREA: 14.9 sq. mi. (38.6 km^2)

GAGE ELEVATION: 5.0 FT. (1.52 m) MSL

HYDRAULIC CONTROL: Subcritical flow - trapezoidal earthen channel and tidal backwater effect.

EQUIPMENT: Stevens A-71 water-stage recorder with nitrogen bubbler and mercury manometer ALERT water level sensor and rain gage.

PERIOD OF RECORD: January 1986 to present

REMARKS: Velocities may be affected by backwater from Bolsa Chica Channel approximately 1/2 mile downstream.

ACCURACY: Good

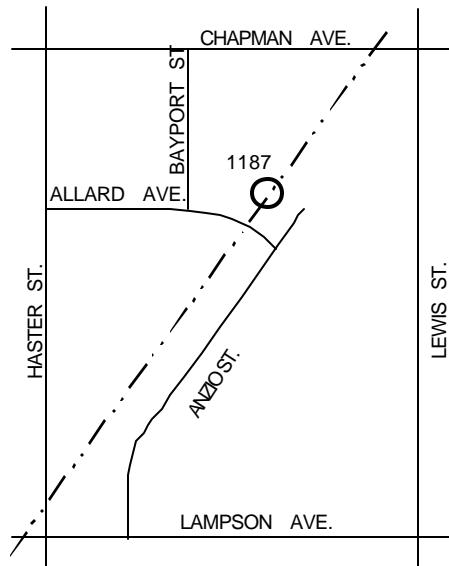
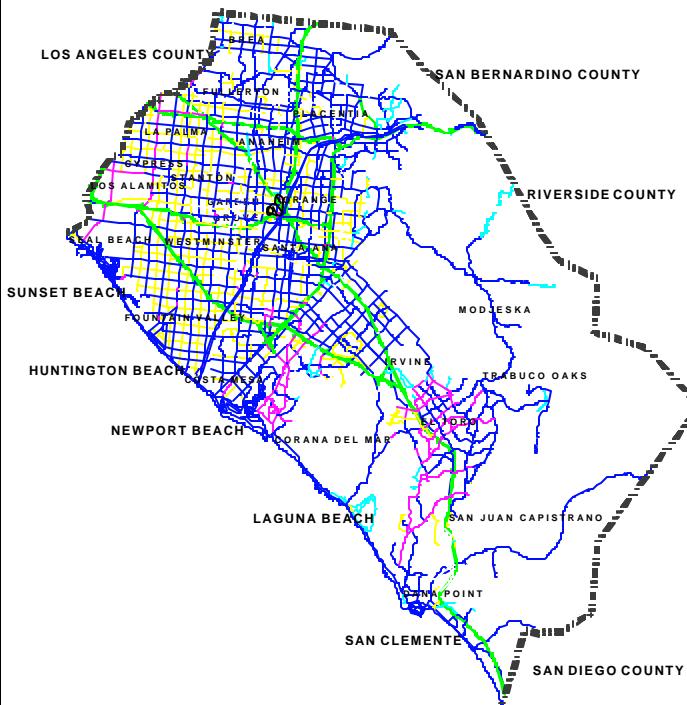
PUBLIC FACILITIES AND RESOURCES DEPARTMENT
232 ANAHEIM-BARBER CITY CHANNEL AT RANCHO

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	3.5	15	15	14	16	16	2.7	4.3	2.2	2.3	3.8	5.8
2	3.3	15	18	14	16	6.3	2.6	1.9	2.3	2.7	3.8	25
3	3.1	15	15	14	16	1.9	2.5	2.1	2.4	4.6	6.6	4.6
4	2.9	15	12	13	16	2.2	2.5	29	2.5	4.7	8.2	3.7
5	2.8	15	12	14	12	8.1	2.6	16	2.4	3.8	6.0	3.8
6	2.7	15	12	15	12	51	2.8	5.4	2.3	45	5.1	3.8
7	2.7	15	13	15	12	2.0	2.9	2.3	2.3	33	4.7	3.8
8	2.5	15	13	15	238	2.2	2.5	1.8	2.2	7.5	4.4	3.8
9	3.8	16	14	15	13	3.8	2.5	14	7.3	9.0	4.4	3.8
10	3.9	17	14	15	13	6.0	2.8	6.1	4.2	4.8	4.3	3.9
11	3.2	17	14	15	15	6.6	4.2	2.4	11	142	4.2	5.5
12	3.6	16	15	15	8.6	4.2	4.3	1.6	4.0	46	5.4	4.4
13	4.2	16	15	15	7.0	2.7	3.1	1.7	3.6	4.2	5.3	4.6
14	4.7	16	16	14	6.0	2.7	2.9	1.9	3.2	3.1	5.3	4.1
15	5.3	15	16	14	5.2	6.3	2.7	2.1	79	2.9	5.2	4.4
16	5.9	15	17	14	4.7	6.8	3.4	3.7	11	2.7	5.1	4.4
17	6.9	15	17	13	4.4	6.6	2.7	2.8	3.6	2.9	5.1	3.9
18	8.0	14	17	13	4.1	6.8	2.7	2.2	3.0	3.1	5.3	3.4
19	9.2	13	18	13	3.9	15	2.5	2.1	3.0	3.3	5.4	3.0
20	10	13	18	13	3.6	12	23	2.1	12	4.1	5.6	2.6
21	12	12	31	12	3.9	5.6	4.5	2.1	2.9	3.8	5.6	2.2
22	13	12	18	14	4.1	8.2	2.0	2.0	2.3	3.7	5.0	1.9
23	14	12	17	16	4.3	7.1	2.1	2.0	2.5	3.9	6.9	1.9
24	13	12	16	17	4.6	3.2	2.1	2.0	2.5	3.5	7.6	2.8
25	14	12	16	17	4.9	3.2	46	2.0	67	3.6	6.9	2.5
26	14	12	16	15	5.2	3.2	34	2.0	7.8	3.8	6.3	2.0
27	14	12	16	15	5.7	3.4	32	2.1	6.0	3.9	5.8	1.4
28	14	12	15	16	81	5.0	3.5	2.1	4.5	4.0	5.6	2.3
29	14	13	15	16	4.5	2.9	2.4	-----	3.1	4.0	5.6	1.9
30	14	14	15	16	1.2	2.7	1.9	-----	2.5	3.9	5.7	1.6
31	14	15	-----	16	-----	2.6	45	-----	2.4	-----	5.8	-----
TOTAL	242.2	441	476	453	545.9	216.3	253.4	121.8	267.0	369.8	170.0	122.8
MEAN	7.81	14.2	15.9	14.6	18.2	6.98	8.17	4.35	8.61	12.3	5.48	4.09
MAX	14	17	31	17	238	51	46	29	79	142	8.2	25
MIN	2.5	12	12	12	1.2	1.9	1.9	1.6	2.2	2.3	3.8	1.4
AC-FT	480	875	944	899	1,080	429	503	242	530	733	337	244
CAL YEAR 1998 TOTAL	5,483.1	MEAN	15.0	MAX	382	MIN	.72	AC-FT	10,880			
WTR YEAR 1999 TOTAL	3,679.2	MEAN	10.1	MAX	238	MIN	1.2	AC-FT	7,300			

Figure 26

UPPER EAST GARDEN GROVE WINTERSBURG STATION NO. 1187



LOCATION: Latitude $33^{\circ} 47' 10''$, Longitude $117^{\circ} 54' 03''$. On the right bank approximately 100 feet upstream of Allard Avenue.

DRAINAGE AREA: 1.6 sq. M. (4.2 km^2)

GAGE ELEVATION: 121 ft. (36.9 in.) MSL

HYDRAULIC CONTROL: Supercritical flow - concrete lined, trapezoidal channel.

EQUIPMENT: Stevens A-71 water stage recorder with Balanced Beam Manometer and ALERT rain gage and water level sensor.

PERIOD OF RECORD: July 1995 to present.

REMARKS: No regulation or diversion above gage.

**RATING CURVE
ACCURACY:** Fair

PUBLIC FACILITIES AND RESOURCES DEPARTMENT
 1187 Upper East Garden Grove Wintersburg

DAILY DISCHARGE IN CUBIC FEET PER SECOND WATER YEAR JUL 1998 TO JUN 1999

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	.03	.01	.02	.01	.02	2.7	.08	.05	.02	.01	.02	.02
2	.02	.01	.02	.01	.02	.05	.03	.01	.02	.01	.02	.62
3	.02	.01	.30	.01	.02	.01	.01	.12	.02	.01	.02	.54
4	.02	.01	.01	.01	.02	.15	.01	.77	.01	.01	.03	.02
5	.02	.01	.02	.01	.02	1.6	.01	.10	.01	.01	.03	.02
6	.02	.01	.02	.01	.03	6.0	.01	.02	.01	2.8	.02	.02
7	.02	.02	.02	.01	.02	.07	.02	.02	0	2.4	.02	.02
8	.02	.02	.02	.05	14	.02	.02	.02	.01	.42	.02	.02
9	.01	.02	.02	.01	.04	.01	.02	1.0	.09	.06	.02	.02
10	.01	.02	.02	.01	.03	.01	.02	.07	.01	.02	.01	.02
11	.01	.03	.02	.01	.23	.01	.02	.02	.21	7.9	.01	.02
12	.01	.03	.02	.01	.03	.01	.02	.01	.02	.72	.01	.03
13	.02	.04	.01	.01	.03	.01	.01	.01	.02	.21	.01	.03
14	.02	.01	.01	.01	.02	.02	.01	.01	.02	.06	.01	.02
15	.02	.01	.01	.02	.02	.02	.01	.02	7.1	.23	.02	.02
16	.02	.01	.01	.02	.02	.02	.01	.02	.05	.04	.03	.02
17	.03	.07	.01	.02	.02	.02	.01	.02	.03	.02	.03	.02
18	.03	.03	.01	.02	.02	.02	.01	.01	.02	.02	.03	.02
19	.03	.03	.01	.02	.01	.02	.01	.01	.04	.03	.03	.02
20	.02	.02	.01	.03	.02	1.6	1.1	.01	.13	.03	.03	.02
21	.02	.02	.01	.05	.02	.04	.03	.02	.02	.03	.03	.02
22	.02	.01	.01	.04	.04	.02	.02	.02	.02	.03	.03	.02
23	.02	.01	.01	.03	.06	.02	.01	.02	.01	.02	.03	.02
24	.02	.02	.02	.03	.09	.01	.01	.02	.01	.02	.03	.02
25	.02	.02	.02	.03	.03	4.1	2.9	.02	5.7	.02	.03	.02
26	.02	.02	.04	.02	6.5	4.9	.02	.02	.02	.03	.03	.02
27	.02	.02	.02	.02	.57	.15	.01	.02	.02	.03	.03	.02
28	.05	.02	.02	.02	7.6	.01	.01	.01	.01	.02	.02	.01
29	.05	.02	.02	.02	.23	.04	.02	-----	.01	.02	.02	.01
30	.02	.02	.02	.02	.10	.01	.01	-----	.01	.02	.02	.01
31	.04	.02	-----	.02	-----	8.0	4.6	-----	.01	-----	.02	-----
TOTAL	0.70	0.62	0.76	0.63	22.85	31.69	14.10	2.46	13.68	15.23	0.71	1.71
MEAN	.023	.020	.025	.020	.76	1.02	.45	.088	.44	.51	.023	.057
MAX	.05	.07	.30	.05	14	8.0	4.9	1.0	7.1	7.9	.03	.62
MIN	.01	.01	.01	.01	.01	.01	.01	.01	0	.01	.01	.01
AC-FT	1.4	1.2	1.5	1.2	45	63	28	4.9	27	30	1.4	3.4
CAL YEAR 1998 TOTAL		282.29	MEAN	.77	MAX	23	MIN	0	AC-FT	560		
WTR YEAR 1999 TOTAL		105.14	MEAN	.29	MAX	14	MIN	0	AC-FT	209		

SECTION 4.0

EVAPORATION, DAMS AND RESERVOIR

4.0 EVAPORATION, RESERVOIRS AND DAMS

4.1 Overview

PFRD maintains and operates two evaporation stations which are located at Sulphur Creek Dam and Villa Park Dam. Each station has a weather bureau-type class A land evaporation pan which is 48 inches in diameter and 10 inches deep and constructed of galvanized sheet metal. In addition, records are kept for six historical evaporation stations. Figure 26 shows the location for historical and active evaporation stations.

Table 42 lists the name and number, location and period of record for each evaporation station. Monthly evaporation for the Villa Park Dam (1974-1999) and Sulphur Creek Dam (1978-1999) are listed in Tables 43 and 44.

There are seven major flood control and water conservation dams in and near Orange County as shown in Figure 28 and described in Table 45. Two of the dams, Villa Park and Sulphur Creek, are operated by PFRD.

Season reservoir operation summaries for the two dams are presented in Tables 46 and 47. Table 48 provides an operational summary for Villa Park Dam (1965-1999).

The maximum storage for Villa Park and Prado Dams from 1965-1999, as percent capacity at the spillway crest, is shown in Figure 29.

4.2 1998-1999 Data Presentation

The maximum monthly evaporation for Villa Park Dam was recorded in July 1998 at 7.39 inches. The total evaporation for the season was 56.93 inches which is approximately 0.08 inches above the long term average.

Villa Park Dam recorded a peak inflow and outflow on January 26 of 15 cfs and November 3 of 25.8 cfs, respectively. The total dam inflow and outflow for the season was 709 and 5,869 acre feet, respectively. The maximum storage of 5,194 acre feet was recorded on July 1.

The total season evaporation for Sulphur Creek Dam was 58.33 inches which was approximately 1.30 inches greater than the long term average. The maximum monthly total of 7.61 inches was recorded in July 1998 whereas the lowest monthly total of 2.58 inches was recorded in January.

Sulphur Creek Dam recorded a peak outflow on April 12 of 65 cfs. The total inflow and outflow volumes for Sulphur Creek Dam were 699 and 702 acre feet, respectively.

Prado Dam recorded a maximum storage for the season of 6,700 acre feet on November 16 which was 3.5 percent of the dam's maximum capacity. The dam recorded a peak inflow on January 27 of 3,600 cfs and a peak outflow of 2,100 cfs on January 28.

Table 42
EVAPORATION SUMMARY
HISTORICAL / PRESENT STATIONS

PFRD NO.	STATION NAME	T.S	R.W	SECT.	LATITUDE NORTH	LONGITUDE WEST	ELEVATION m	ft	RECORD FROM	TO
23	Prado Dam	3	7	20P	33-53-24	117-38-09	175	575	07/30	12/69
125	Irvine Evaporation	6	8	6M	33-40-38	117-45-33	60	197	01/46	01/73
126	Fullerton Airport	3	10	31D	33-52-23	117-58-24	29	96	01/35	06/77
127	Huntington Beach	5	11	21F	33-43-22	118-02-00	5	15	08/34	12/45
173	Villa Park Dam	4	9	24A	33-48-53	117-46-00	174	573	12/63	Present
174	Atwood	3	9	32K	33-51-48	117-50-30	73	240	04/70	06/77
176	El Toro	6	8	26D	33-37-39	117-41-26	139	455	09/65	06/77
216	Sulphur Creek Dam	7	8	22F	33-32-59	117-42-20	58	190	06/75	Present

Table 43

VILLA PARK DAM
Station 173
MONTHLY EVAPORATION SUMMARY
(1974 -1999 in inches)

SEASON	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1973-74	7.42	6.61	5.24	4.81	2.25	2.51	1.88	4.16	1.55	5.00	5.03	7.21	53.67
1974-75	6.23	6.52	6.07	3.33	3.60	3.39	2.51	2.07	3.08	3.64	5.23	4.88	50.55
1975-76	7.63	7.01	6.18	4.26	4.51	3.32	5.22	3.10	3.70	4.30	4.13	7.74	61.10
1976-77	6.71	6.24	3.15	4.96	4.84	4.11	3.00	3.09	4.12	4.38	4.18	5.17	53.95
1977-78	8.24	6.18	5.33	3.80	3.61	2.14	1.74	1.67	1.63	3.63	6.46	6.90	51.33
1978-79	8.14	6.91	5.72	4.30	2.14	2.04	1.99	2.52	2.76	4.25	5.00	6.26	52.03
1979-80	5.49	6.07	6.27	3.57	3.37	2.93	2.14	2.60	3.84	5.11	4.34	6.62	52.35
1980-81	7.98	6.70	4.66	4.78	4.32	3.62	2.66	3.20	3.91	4.32	5.61	8.33	60.09
1981-82	7.66	7.30	6.14	5.28	3.38	2.05	2.70	2.48	3.21	4.69	3.92	5.35	54.14
1982-83	7.15	7.32	4.72	5.52	2.86	2.45	2.65	1.96	3.21	4.06	5.14	4.14	51.18
1983-84	7.45	7.07	6.53	4.42	2.22	1.79	3.37	3.94	5.07	5.82	7.08	6.52	61.28
1984-85	7.98	7.85	6.08	6.22	2.68	2.75	2.90	3.23	3.88	4.99	5.80	7.28	61.62
1985-86	7.94	7.68	5.93	4.20	3.11	3.05	3.09	2.55	3.40	5.29	6.08	6.94	59.24
1986-87	7.64	7.21	5.17	4.01	3.50	2.05	2.86	3.42	3.11	3.58	4.89	5.18	52.80
1987-88	6.51	6.70	5.31	4.80	2.95	2.88	2.99	4.42	6.16	4.66	6.87	6.52	60.77
1988-89	6.43	7.33	5.17	3.94	2.68	3.12	3.23	2.33	4.25	5.86	6.12	5.84	56.30
1989-90	7.62	7.35	5.74	4.41	5.04	3.31	3.01	2.28	3.43	3.78	5.73	6.40	58.10
1990-91	7.57	6.36	4.81	4.54	4.13	2.81	2.25	3.00	4.15	5.18	6.15	5.84	56.79
1991-92	5.80	5.83	5.65	4.51	3.41	2.68	2.81	2.54	3.31	4.79	5.32	6.84	53.49
1992-93	6.71	6.40	5.59	4.71	3.69	2.62	2.19	2.41	3.70	4.80	5.59	6.39	54.80
1993-94	7.49	7.18	5.98	5.09	4.03	3.21	3.41	3.19	3.98	4.87	5.16	6.85	60.44
1994-95	6.90	7.63	6.21	4.62	2.63	2.48	1.98	1.94	3.15	4.27	4.40	4.76	50.97
1995-96	7.08	7.52	6.10	5.25	4.01	3.15	1.74	2.13	2.97	4.49	5.24	6.71	56.39
1996-97	7.49	7.17	6.01	4.22	3.14	2.77	2.02	3.41	3.97	4.68	5.45	6.40	56.73
1997-98	6.65	6.42	6.14	3.87	3.16	2.59	1.98	1.49	3.68	4.02	5.21	6.37	51.58
1998-99	7.39	6.80	6.07	5.01	2.95	2.85	2.69	2.92	3.81	3.95	5.61	6.88	56.93
MEAN	7.20	6.90	5.61	4.56	3.39	2.80	2.65	2.77	3.58	4.55	5.37	6.32	55.71
MAXIMUM	8.24	7.85	6.53	6.22	5.04	4.11	5.22	4.42	6.18	5.86	7.08	8.33	61.62
MINIMUM	5.49	5.83	3.15	3.33	2.14	1.79	1.74	1.49	1.55	3.58	3.92	4.14	50.55

Table 44

SULPHUR CREEK DAM
 Station 216
MONTHLY EVAPORATION SUMMARY
 (1978-1999 in inches)

SEASON	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1977-78	8.48	7.31	6.10	4.79	3.65	1.52	2.57	3.50	2.97	4.78	7.25	7.43	60.35
1978-79	8.42	7.31	6.64	4.43	2.84	2.06	2.30	2.86	3.81	5.76	6.03	5.42	57.88
1979-80	7.92	6.82	6.73	4.28	3.37	2.85	3.13	1.86	4.54	5.18	6.03	6.91	59.62
1980-81	7.97	7.22	5.52	5.02	3.66	2.64	2.65	3.15	4.26	4.90	6.65	7.80	61.44
1981-82	8.26	7.85	5.59	4.22	3.09	1.92	2.42	2.22	3.76	5.11	4.77	4.88	54.09
1982-83	7.81	6.58	5.13	5.00	2.98	2.33	2.57	1.90	4.80	4.95	6.29	5.70	56.04
1983-84	7.92	5.29	6.09	2.26	3.62	3.49	2.63	3.41	4.36	3.61	6.89	6.53	56.10
1984-85	8.06	6.91	6.27	4.61	3.83	2.82	2.24	2.74	3.79	4.78	6.32	7.57	59.94
1985-86	8.06	6.41	5.84	4.77	2.95	2.52	2.70	2.85	3.95	5.61	6.55	6.88	59.09
1986-87	7.66	8.05	4.59	4.00	3.57	3.91	3.40	2.94	3.53	5.66	6.17	6.70	60.18
1987-88	4.81	7.03	5.24	3.51	2.30	1.92	3.32	3.62	5.33	5.30	6.95	6.65	55.98
1988-89	7.48	6.87	5.18	4.35	2.50	2.27	2.60	2.37	4.08	6.14	5.54	6.04	55.42
1989-90	7.49	6.95	5.77	4.19	2.74	4.27	1.56	1.80	3.93	4.96	6.13	7.00	56.79
1990-91	8.39	5.83	4.78	4.79	3.79	1.99	2.48	3.09	3.07	4.99	4.55	4.66	52.41
1991-92	5.96	7.80	5.64	4.69	3.74	2.55	2.52	2.58	3.48	5.23	5.08	5.89	55.16
1992-93	6.81	6.37	5.77	3.98	3.36	2.41	1.91	2.59	4.18	5.24	6.22	6.62	55.46
1993-94	7.48	6.98	5.79	4.51	3.20	2.62	2.87	2.65	3.77	4.84	5.96	6.69	57.36
1994-95	7.21	7.02	6.03	4.71	2.98	2.39	2.18	2.26	3.47	4.67	5.19	6.08	54.19
1995-96	7.39	7.41	5.87	4.21	3.12	2.49	2.17	1.94	3.24	4.81	5.87	6.51	55.03
1996-97	7.68	7.01	5.98	4.41	3.25	2.09	1.79	2.95	4.27	5.29	6.31	6.67	57.70
1997-98	7.50	6.89	5.62	4.99	3.08	2.49	2.40	1.70	3.98	4.88	5.45	6.58	55.56
1998-99	7.61	7.11	5.82	4.32	3.19	2.65	2.58	2.89	4.02	5.06	6.27	6.81	58.33
MEAN	7.56	6.96	5.73	4.37	3.22	2.55	2.50	2.63	3.94	5.08	6.02	6.46	57.01
MAXIMUM	8.48	8.05	6.73	5.02	3.83	4.27	3.40	3.62	5.33	6.14	7.25	7.80	61.44
MINIMUM	4.81	5.29	4.59	2.26	2.30	1.52	1.56	1.70	2.97	3.61	4.55	4.66	52.41

Table 45
SPECIFICATION SUMMARY
MAJOR FLOOD CONTROL AND WATER CONSERVATION DAMS

DAM	DATE COMPLETE	OPERATED BY	OPERATION	WATER SOURCE	DRAINAGE AREA (SQ. MI.)	STORAGE CAPACITY at SPILLWAY (AC-FT)	MAXIMUM REGULATED (CFS)
BREA DAM	3/42	CORP OF ENGINEERS	FLOOD CONTROL	BREA CREEK	21.5	4,090	1,400
CARBON CANYON DAM	2/61	CORP OF ENGINEERS	FLOOD CONTROL, CONSERVATION	CARBON CREEK	19.5	7,030	1,100
FULLERTON DAM	10/41	CORP OF ENGINEERS	FLOOD CONTROL	FULLERTON CREEK	5.1 (1)	743	250
PRADO DAM		CORP OF ENGINEERS	FLOOD CONTROL	SANTA ANA RIVER	1,485 (2)	187,600	5,000
SANTIAGO DAM	12/31	SERRANO IRRIGATION DISTRICT	CONSERVATION, IMPORTED STORAGE	SANTIAGO CREEK	63.1	25,000	(3)
VILLA PARK DAM	1/63	PFRD	FLOOD CONTROL, CONSERVATION	SANTIAGO CREEK	20.3 (4)	15,400	6,000
SULPHUR CREEK DAM	8/65	PFRD	FLOOD CONTROL, RECREATION	SULPHUR CREEK	4.6	510	110

1. Includes 3.5 sq. mi. from Loftus Diversion
2. Does not include 750 sq. mi. above Lake Elsinore
3. Water released as required for irrigation
4. Does not include 63.1 sq. mi. above Santiago Dam

Table 46
VILLA PARK DAM
RESERVOIR OPERATION SUMMARY
(1998-1999)

END OF MONTH	WATER SURFACE ELEVATION FT	RESERVOIR STORAGE AC-FT	RESERVOIR CHANGE AC-FT	TOTAL INFLOW AC-FT	TOTAL OUTFLOW AC-FT
JUL	532.0	4,075	-1,119	45	1,164
AUG	527.2	2,978	-1,097	64	1,161
SEP	521.1	1,850	-1,128	88	1,216
OCT	511.7	699	-1,151	99	1,250
NOV	510.8	615	-84	106	190
DEC	511.4	673	58	58	0
JAN	512.0	723	50	50	0
FEB	512.4	762	39	39	0
MAR	512.8	798	36	36	0
APR	513.0	820	22	22	0
MAY	508.9	463	-357	0	357
JUN	496.4	34	-429	102	531
	SEASON TOTALS			709	5,869

Maximum Inflow: 15 cfs on 1-26-99
 Maximum Outflow: 25.8 cfs on 11-3-98
 Max. Water-Stage Elev.: 536.31 feet on 7-1-98
 Maximum Storage: 5,194 acre feet on 7-1-98

SPECIFICATIONS:

Outlet Gate Sill	Elevation 484 ft = 0 Ac-Ft Storage
Debris Pool	Elevation 510 ft = 552 Ac-Ft Storage
Spillway Crest	Elevation 566 ft = 15,400 Ac-Ft Storage

Table 47
SULPHUR CREEK DAM
RESERVOIR OPERATION SUMMARY
(1998-1999)

END OF MONTH	WATER SURFACE ELEVATION FT	RESERVOIR STORAGE AC-FT	RESERVOIR CHANGE AC-FT	TOTAL INFLOW AC-FT	TOTAL OUTFLOW AC-FT
JUN	189.12	387			
JUL	189.12	387	0	12	12
AUG	189.50	401	14	18	4
SEP	189.08	386	-15	30	45
OCT	189.10	386	0	18	18
NOV	189.16	388	2	136	134
DEC	189.16	388	0	104	104
JAN	189.45	399	11	153	142
FEB	189.15	388	-11	29	40
MAR	189.06	384	-4	71	75
APR	189.05	384	0	106	106
MAY	189.06	384	0	12	12
JUN	189.05	384	0	10	10
	SEASON TOTALS			699	702

Maximum Inflow: 402 cfs on 1-26-99
 Maximum Outflow: 65 cfs on 4-12-99
 Max. Water-Stage Elev.: 190.85 feet on 11-8-98

SPECIFICATIONS:

Lower Outlet	Elevation 161 ft = 0 Ac-Ft Storage
Upper Outlet	Elevation 174 ft = 45 Ac-Ft Storage
Auxiliary Outlet	Elevation 189 ft = 382 Ac-Ft Storage
Spillway Crest	Elevation 192 ft = 508 Ac-Ft Storage

Table 48
VILLA PARK DAM
OPERATIONAL SUMMARY
(1965-1999)

SEASON	MAX STORAGE		MIN STORAGE		PEAK INFLOW		PEAK OUTFLOW		TOTAL INFLOW AC-FT	TOTAL OUTFLOW AC-FT *
	AC-FT	DATE	AC-FT	DATE	CFS	DATE	CFS	DATE		
1965	102	10-Apr-65	0		55	09-Apr-65	2	22-May-65	114	94
1966	455	10-Apr-66	0		441	22-Nov-65	3	17-Apr-66	456	332
1967	455	14-May-67	0		971	06-Dec-66	43	23-Dec-66	2,448	1,030
1968	1,702	14-May-68	340	08-Nov-67	900	08-Mar-68	41	16-Apr-68	1,467	2,019
1969	17,673	25-Feb-69	0		10,981	25-Feb-69	6,003	25-Feb-69	63,559	62,262
1970	1,419	01-Jul-69	0		28	04-Mar-70	25	01-Oct-69	805	1,946
1971	190	02-Apr-71	0		169	21-Dec-70	30	21-Sep-70	327	422
1972	145	29-Dec-71	0		108	28-Dec-71	21	22-May-72	193	222
1973	1,094	16-Apr-73	0		625	11-Feb-73	3	28-Jun-73	1,248	374
1974	876	01-Jul-73	40	30-Jun-74	206	07-Jan-74	80	20-Dec-73	465	1,303
1975	957	28-Apr-75	0		106	08-Mar-75	2	24-Jun-75	185	208
1976	37	04-Mar-76	0		14	03-Mar-76	80	14-May-76	126	108
1977	26	10-May-77	0		25	09-May-77	160	19-Apr-77	58	61
1978	6,032	21-Apr-78	0		3,330	04-Mar-78	2,825	10-Feb-78	40,940	38,995
1979	4,126	10-Apr-79	781	20-Feb-79	500	27-Mar-79	60	02-Feb-79	4,540	2,902
1980	5,326	13-Mar-80	0		2,380	18-Feb-80	2,701	18-Feb-80	37,049	40,616
1981	316	21-Apr-81	0		215	29-Jan-81	4	01-Jun-81	648	625
1982	499	03-Apr-82	0		320	17-Mar-82	10	01-Apr-82	525	507
1983	5,967	01-Mar-83	0		4,167	01-Mar-83	1,201	01-Mar-83	23,672	22,375
1984	1,581	01-Jul-83	622	30-Jun-84	480	01-Oct-83	200	01-May-83	688	1,751
1985	622	01-Jun-84	166	30-Jun-85	180	28-Dec-84	4	19-Apr-85	457	995
1986	289	18-Mar-86	0		315	15-Feb-86	25	02-Aug-85	383	438
1987	54	01-Jul-86	0		0		5	07-Jul-86	0	54
1988	41	18-Jun-88	0		37	29-Jun-88	37	19-Jun-88	2,525	2,488
1989	165	10-Feb-89	0		62	25-Dec-88	37	30-Jun-89	4,133	4,124
1990	29	02-Jun-90	0		5	17-Feb-90	1	12-Jun-90	187	183
1991	566	30-Mar-91	0		151	27-Mar-91	74	04-Apr-91	690	488
1992	1,298	02-Apr-92	0		185	21-Mar-92	100	19-Jun-92	1,380	1,012
1993	3,224	27-Jan-93	0		3,056	18-Jan-93	3,000	18-Jan-93	55,470	55,458
1994	717	17-Jun-94	535	30-Dec-93	60	20-Feb-94	126	23-Jul-93	364	299
1995	3,853	28-Mar-95	0		2,850	6-Mar-95	3,000	6-Mar-95	23,649	24,309
1996	172	1-May-96	0		55	21-Feb-96	12	4-Mar-96	716	597
1997	172	2-Mar-97	20	23-Sep-96	266	26-Jan-97	24	14-Mar-97	810	741
1998	5,568	18-Jun-98	68	30-Sep-97	6000	24-Feb-98	3000	24-Feb-98	29,670	23,667
1999	5,194	1-Jul-98	0	22-Jul-99	15	26-Jan-99	26	3-Nov-98	709	5,869

* Includes evaporation, infiltration and lateral storage

Figure 27

EVAPORATION STATIONS
LOCATION MAP

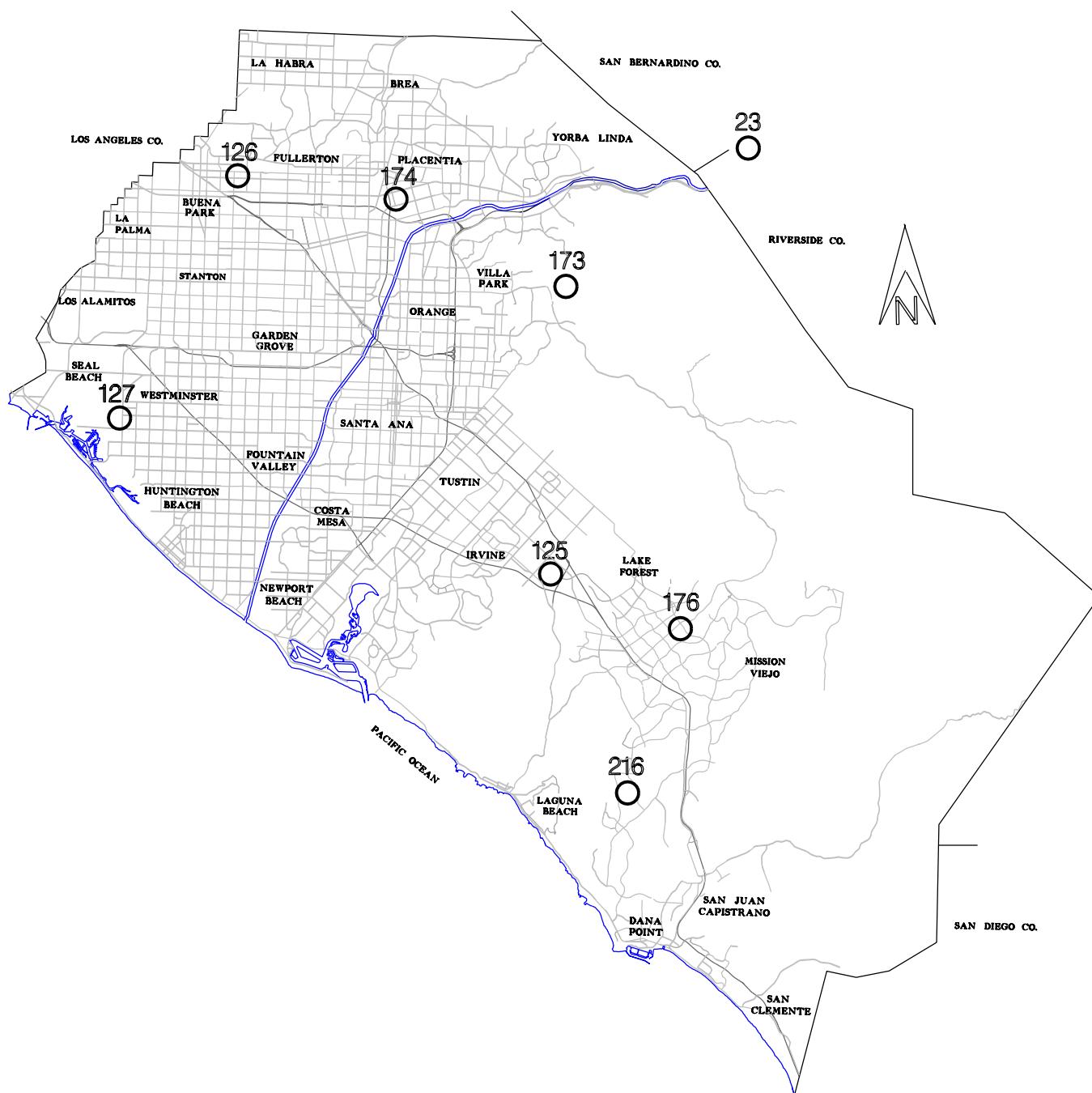


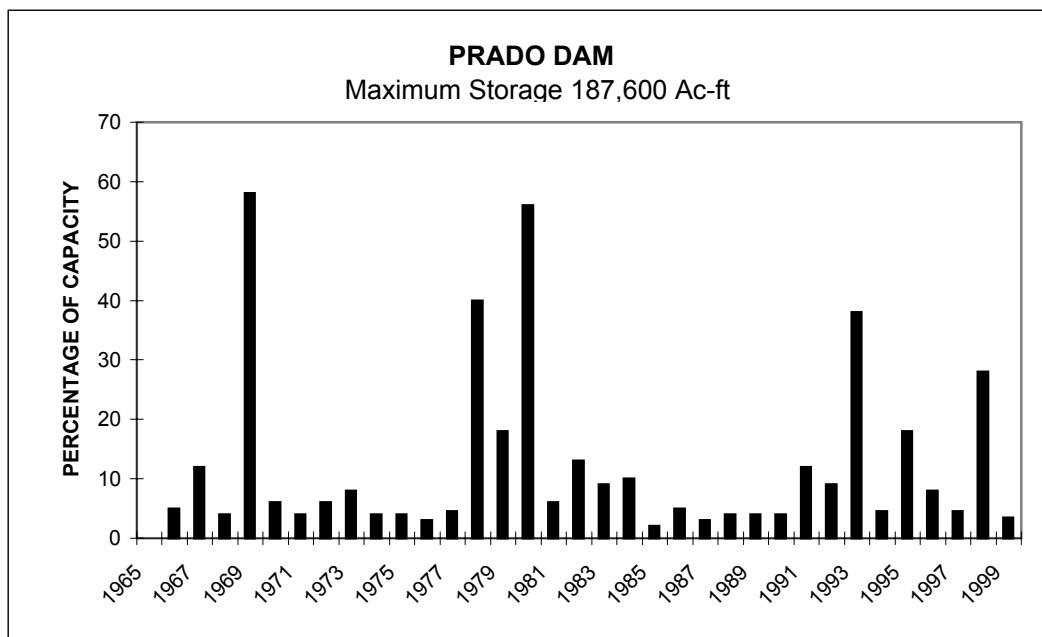
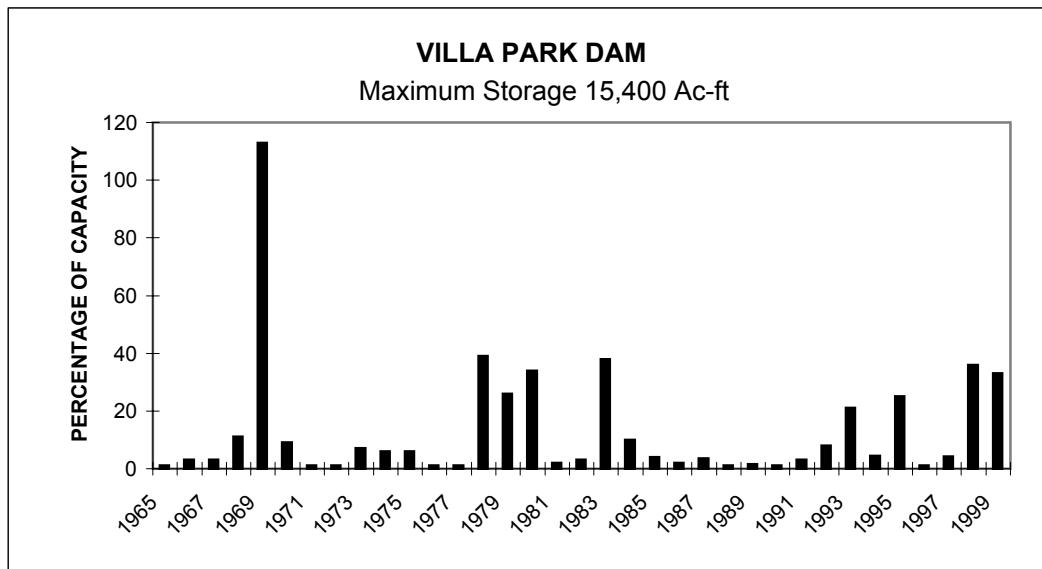
Figure 28

MAJOR FLOOD CONTROL AND WATER CONSERVATION DAMS
LOCATION MAP



Figure 29

**VILLA PARK DAM AND PRADO DAM
MAXIMUM STORAGE DURING SEASON
AS PERCENT OF CAPACITY AT SPILLWAY CREST
(1965-1999)**



APPENDIX A
HISTORICAL DISCHARGE SUMMARIES

FULLERTON CREEK at RICHMAN
STATION 2

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1961	128	26-Jan-61	0.00	0.5	352
1962	541	16-Feb-62	0.00	1.4	1,070
1963	396	09-Feb-63	0.00	0.6	402
1964	435	20-Nov-63	0.00	0.6	449
1965	240	01-Apr-65	0.00	0.7	529
1966	459	30-Jan-66	0.00	1.3	949
1967	721	07-Jan-67	0.00	2.9	2,140
1968	622	08-Mar-68	0.00	1.6	1,151
1969	1,099	25-Jan-69	0.00	9.2	6,640
1970	527	06-Nov-69	0.00	1.3	900
1971	527	21-Dec-70	0.00	1.5	1,119
1972	481	24-Dec-71	0.00	1.4	997
1973	625	07-Dec-72	0.00	3.4	2,489
1974	1,049	07-Jan-74	0.00	2.1	1,557
1975	820	04-Dec-74	0.00	2.3	1,727
1976	784	12-Apr-76	0.00	2.1	1,557
1977	625	03-Jan-77	0.00	2.3	1,727
1978	1,739	06-Feb-78	0.11	14.7	10,620
1979	541	16-Feb-79	0.00	8.5	6,169
1980	2,049	28-Jan-80	0.11	12.0	2,335
1981	1,265	01-Mar-81	0.00	3.1	4,037
1982	1,276	27-Nov-81	0.00	5.5	3,802
1983	2,760	01-Mar-83	0.18	14.2	10,182
1984	1,982	01-Oct-83	0.11	3.2	3,434
1985	1,279	18-Dec-84	0.67	5.6	2,736
1986	1,544	15-Dec-86	0.00	5.3	4,503
1988	1,565	04-Dec-87	0.24	4.7	3,434
1989	892	24-Dec-88	0.18	3.8	2,736
1990	1,154	17-Feb-90	0.18	6.6	4,503
1991	840	27-Feb-91	0.31	5.0	3,550
1992	2,500	13-Feb-92	0.16	7.3	4,890
1993	2,450	07-Dec-92	0.49	13.8	10,030
1994	804	24-Mar-94	0.49	4.4	3,180
1995	2,640	04-Jan-95	0.04	11.6	8,380
1996	1,700	20-Feb-96	0.11	4.7	3,430
1997	884	15-Jan-97	0.28	6.6	4,780
1998	1,640	07-Feb-98	0.10	14.1	10,230
1999	491	15-Mar-99	0.18	3.9	2,820
2000	997	21-Feb-00	0.11	3.9	2,800

ALISO CREEK at JERONIMO
STATION 4

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1932	508	01-Feb-32	0.00	0.8	558
1933	352	19-Jan-33	0.00	0.2	165
1934	494	01-Jan-34	0.00	0.2	155
1935	1,236	02-Mar-35	0.00	0.9	633
1936	1,423	12-Feb-36	0.00	0.5	353
1937	1,949	06-Feb-37	0.00	3.0	618
1938	1,282	02-Mar-38	0.00	2.2	1,613
1939	231	03-Mar-39	0.00	0.6	386
1940	547	27-Nov-39	0.00	0.4	301
1941	632	01-Mar-41	0.00	3.5	2,545
1942	20	11-Apr-42	0.00	0.1	28
1943	943	23-Jan-43	0.00	2.7	1,912
1944	879	22-Feb-44	0.00	0.9	613
1945	678	14-Nov-44	0.00	0.5	365
1946	182	22-Dec-45	0.00	0.2	111
1947	90	23-Nov-46	0.00	0.2	156
1948	102	05-Dec-47	0.00	0.2	130
1949	2	12-Jan-49	0.00	0.1	1
1950	85	06-Feb-50	0.00	0.1	11
1952	950	16-Jan-52	0.00	2.0	1,524
1953	133	01-Dec-52	0.00	0.1	45
1954	122	13-Dec-53	0.00	0.1	79
1955	15	18-Jan-55	0.00	0.1	6
1956	505	26-Jan-56	0.00	0.6	425
1957	2	13-Jan-57	0.00	0.1	1
1958	964	16-Mar-58	0.00	2.0	1,378
1959	2	06-Jan-59	0.00	0.1	2
1960	32	12-Jan-60	0.00	0.1	13
1962	73	16-Feb-62	0.00	0.2	177
1963	88	11-Feb-63	0.00	0.1	62
1964	67	20-Nov-63	0.00	0.4	24
1965	81	10-Apr-65	0.00	0.4	391
1966	277	29-Dec-65	0.00	0.6	404
1967	333	02-Dec-66	0.00	0.8	571
1968	35	21-Nov-67	0.00	0.2	174
1969	2,498	24-Feb-69	0.00	6.0	4,321
1970	95	04-Mar-70	0.00	0.1	49
1971	35	19-Dec-70	0.00	0.1	47
1972	81	28-Dec-71	0.00	0.4	212
1973	636	11-Feb-73	0.00	0.7	508
1974	223	07-Jan-74	0.00	0.6	373
1975	300	04-Dec-74	0.00	0.5	325
1976	58	10-Jun-76	0.00	0.1	54
1977	57	08-May-77	0.00	0.4	200
1978	324	10-Feb-78	0.00	1.8	1,273
1979	245	05-Jan-79	0.00	2.6	1,873
1980	2,099	16-Feb-80	0.00	8.8	6,421
1981	225	19-Mar-81	0.00	1.3	973
1982	161	01-Apr-82	0.00	1.5	1,040
1983	1,671	27-Feb-83	0.00	4.1	2,983
1984	519	01-Oct-83	0.11	1.8	1,309
1985	442	19-Dec-84	0.07	2.1	1,532
1986	508	15-Feb-86	0.00	2.7	1,946
1987	190	17-Nov-86	0.35	0.5	372
1988	321	04-Dec-88	0.49	2.7	1,913
1989	315	24-Dec-89	0.49	3.8	2,776
1990	260	17-Feb-90	0.36	1.5	1,059
1991	610	27-Feb-91	0.43	1.8	1,290
1992	3,000	12-Feb-92	0.10	3.2	2,290
1993	2,090	08-Feb-93	0.07	9.9	7,150
1994	459	17-Feb-94	0.33	1.9	1,360
1995	2,120	10-Jan-95	0.03	7.4	5,340
1996	387	31-Jan-96	0.17	2.4	1,750
1997	1,070	21-Nov-96	0.04	2.4	1,760
1998	4,500	06-Dec-97	0.43	9.6	6,920
1999	254	28-Nov-98	0.36	2.06	1,490
2000	772	20-Feb-00	0.11	3.53	2,570

TIRABUCO CREEK at CAMINO CAPISTRANO
STATION 5

ALAMEDA STORM CHANNEL at HEWES ST.
STATION 152

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1932	381	18-Feb-32	0.00	4.6	3,355
1933	4	19-Feb-33	0.00	0.2	105
1934	6	01-Jan-34	0.00	0.1	77
1935	198	05-Jan-35	0.00	0.6	414
1936	160	15-Feb-36	0.00	0.5	391
1937	8,545	06-Feb-37	0.00	35.2	25,365
1938	4,414	02-Mar-38	0.00	16.4	13,209
1939	188	03-Feb-39	0.00	2.5	1,710
1940	357	03-Feb-40	0.00	2.8	2,026
1941	876	21-Feb-41	0.00	32.3	23,258
1942	8	25-Jul-41	0.00	0.6	407
1943	2,846	23-Jan-43	0.00	12.9	9,319
1944	897	22-Feb-44	0.00	5.2	3,679
1945	218	15-Mar-45	0.00	5.8	4,100
1946	133	23-Dec-45	0.00	0.2	170
1947	127	23-Nov-46	0.00	0.5	370
1948	7	05-Dec-47	0.00	0.1	6
1949	4	13-Jan-49	0.00	0.1	3
1950	4	11-Jan-50	0.00	0.1	4
1951	0	08-Jan-51	0.00	0.1	1
1952	851	16-Jan-52	0.00	9.9	7,075
1953	4	01-Dec-52	0.00	0.1	15
1954	66	25-Jan-54	0.00	1.6	1,199
1955	4	18-Jan-55	0.00	0.1	41
1956	752	27-Jan-56	0.00	2.0	1,410
1957	3	13-Jan-57	0.00	0.2	112
1958	1,928	16-Mar-58	0.00	16.6	11,994
1959	2	21-Feb-59	0.00	0.1	87
1960	182	01-Jan-60	0.00	0.1	103
1961	2	06-Nov-60	0.00	0.1	19
1962	93	21-Feb-62	0.00	0.1	908
1963	9	10-Feb-63	0.00	1.3	56
1964	11	20-Nov-63	0.00	0.1	25
1965	31	08-Apr-65	0.00	0.1	26
1966	999	23-Nov-65	0.00	3.7	2,771
1967	3,199	06-Dec-66	0.00	17.3	12,480
1968	16	21-Nov-67	0.00	0.6	481
1969	7,980	24-Feb-69	0.00	54.4	39,141
1970	27	05-Mar-70	0.00	2.2	1,613
1971	44	21-Dec-70	0.00	0.2	155
1972	54	28-Dec-71	0.00	0.1	66
1973	639	11-Feb-73	0.00	4.8	3,476
1974	59	08-Jan-74	0.00	0.8	553
1975	51	04-Dec-74	0.00	0.4	304
1976	16	01-Mar-76	0.00	0.1	27
1977	27	03-Jan-77	0.00	0.1	32
1978	950	01-Mar-78	0.00	25.6	18,639
1979	399	05-Jan-79	0.00	11.4	8,104
1980	3,238	29-Jan-80	0.00	35.5	25,770
1981	565	29-Jan-81	0.00	3.6	2,601
1982	420	17-Mar-82	0.00	5.5	3,979
1983	2,447	27-Feb-83	0.00	21.5	17,747
1984	189	01-Oct-83	0.00	6.5	4,701
1985	225	09-Feb-85	0.00	2.9	2,034
1986	188	15-Feb-86	0.00	7.3	5,259
1987	89	25-Sep-86	0.00	0.4	287
1988	430	18-Jan-88	0.00	0.1	419
1989	697	25-Dec-88	0.00	2.2	1,580
1990	376	17-Feb-90	0.00	0.2	950
1992	1,460	12-Feb-92	0.00	1.9	1,360
1993	NR		NR	NR	
1994	NR		NR	NR	
1995	NR		NR	NR	
1996	363	21-Feb-96	0.23	16.9	7900 *
1997	285	26-Jan-97	0.01	9.0	6,530
1998	Station discontinued - USGS gage at Del Obispo activated				

* Partial discharge

NR = No Record due to widening of I-5 Freeway

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1938	901	28-Mar-38	0.00	1.5	1,060
1939	1,000	18-Dec-38	0.00	0.9	668
1940	322	03-Feb-40	0.00	0.2	134
1941	562	14-Feb-41	0.00	2.7	1,930
1942	91	10-Dec-41	0.00	0.3	235
1943	537	23-Jan-43	0.00	2.3	1,640
1944	1,220	22-Feb-44	0.00	1.7	1,220
1945	267	02-Feb-45	0.00	1.1	788
1946	251	22-Dec-45	0.00	0.6	422
1947	256	14-Nov-46	0.00	0.8	574
1948	30	03-Apr-48	0.00	0.4	316
1949	27	07-Feb-49	0.00	0.4	253
1950	78	06-Feb-50	0.00	0.5	328
1951	49	13-Nov-50	0.00	0.2	152
1952	1,190	16-Jan-52	0.00	1.8	1,280
1953	236	01-Dec-52	0.00	0.4	275
1954	80	13-Feb-54	0.00	0.4	277
1955	39	18-Jan-55	0.00	0.3	255
1956	346	26-Jan-56	0.00	0.6	427
1957	85	13-Jan-57	0.00	0.1	63
1958	303	19-Feb-58	0.00	1.5	1,100
1959	180	06-Jan-59	0.00	0.4	261
1960	47	12-Jan-60	0.00	0.2	142
1961	6	06-Nov-60	0.00	0.1	39
1962	65	15-Dec-62	0.00	0.2	162
1963	NR		NR	NR	
1964	NR		NR	NR	
1965	NR		NR	NR	
1966	285	29-Dec-65	NR	NR	
1967	290	24-Jan-67	0.00	1.1	759
1968	67	08-Mar-68	0.00	0.2	133
1969	870	23-Feb-69	0.00	2.8	1,990
1970	178	01-Mar-70	0.00	0.2	172
1971	470	19-Dec-70	0.00	0.6	405
1972	132	24-Dec-71	0.00	0.1	103
1973	192	11-Mar-73	0.00	0.4	316
1974	178	07-Jan-74	0.00	0.3	241
1975	173	04-Dec-74	0.00	0.3	197
1976	202	02-Mar-76	0.00	0.2	148
1977	164	03-Jan-77	0.00	0.3	243
1978	1,046	04-Mar-78	0.00	4.4	3,032
1979	887	27-Mar-79	0.00	3.2	2,351
1980	958	16-Feb-80	0.00	4.8	3,454
1981	466	01-Mar-81	0.00	1.5	1,070
1982	389	17-Mar-82	0.00	1.4	1,017
1983	1,491	01-Mar-83	0.00	NR	NR
1984	202	25-Dec-83	0.00	NR	NR
1985	367	18-Dec-84	0.00	NR	NR
1986	NR		NR	NR	
1987	NR		NR	NR	
1988	NR		NR	NR	
1989	226	24-Dec-88	0.00	0.2	156
1990	NR		NR	NR	
1992	NR		NR	NR	
1993	NR		NR	NR	
1994	226	07-Feb-94	0.40	2.0	1,440
1995	497	04-Jan-95	0.19	1.4	1,010
1996	93	20-Feb-96	0.00	1.3	949
1998	391	07-Feb-98	0.01	0.9	601
1999	Station taken off line due to constructin of new gage house				
2000	Station taken off line due to constructin of new gage house				

NR = No Record

**WESTMINSTER CHANNEL at HAZARD
STATION 207**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1958	226	03-Feb-58	0.00	1.1	1,187
1959	198	06-Jan-59	0.00	0.4	392
1960	165	01-Feb-60	0.00	0.5	576
1961	127	26-Jan-61	0.00	0.1	137
1962	241	19-Feb-62	0.00	1.2	1,283
1963	509	09-Feb-63	0.00	0.6	633
1964	202	20-Nov-63	0.00	0.5	597
1965	371	01-Apr-65	0.00	0.9	965
1966	330	22-Nov-65	0.00	2.0	2,134
1967	792	22-Jan-67	0.10	2.1	2,331
1968	742	21-Nov-67	0.10	1.3	1,456
1969	337	23-Feb-69	0.00	2.9	3,256
1970	200	04-Mar-70	0.00	1.1	1,234
1971	283	19-Dec-70	0.00	0.9	946
1972	330	24-Dec-71	0.00	0.4	474
1973	263	14-Nov-72	0.00	1.4	1,517
1974	512	04-Jan-74	0.00	1.6	1,715
1975	1,000	04-Dec-74	0.00	1.6	1,763
1976	214	06-Feb-76	0.00	0.6	704
1977	304	08-May-77	0.00	1.1	1,246
1978	707	04-Mar-78	0.00	4.5	4,835
1979	544	06-Jan-79	0.00	7.6	2,874
1980	940	14-Feb-80	0.00	4.6	3,886
1981	841	29-Jan-81	0.00	1.4	1,579
1982	989	28-Nov-81	0.00	2.4	2,615
1983	1,480	01-Mar-83	0.00	NA	NA
1984	NA	NA	0.00	1.3	1,367
1986	996	14-Feb-86	0.00	4.0	123
1987	1,011	03-Jan-87	0.00	1.9	1,342
1988	320	17-Jan-88	0.00	4.7	2,823
1989	808	24-Dec-88	0.00	0.8	638
1990	445	17-Feb-90	0.00	2.0	1,312
1991	475	27-Feb-91	0.00	7.8	1,118
1992	1,120	12-Feb-92	0.00	3.9	2,820
1993	1,050	07-Dec-92	0.00	5.7	4,160
1994	686	17-Feb-94	0.20	3.9	2,810
1995	1,140	04-Jan-95	0.23	6.3	4,580
1996	493	20-Feb-96	0.68	5.2	3,740
1997	651	13-Jan-97	0.15	6.8	4,930
1998	809	06-Dec-97	0.27	8.6	6,240
1999	485	08-Nov-98	0.23	5.6	4,040
2000	444	17-Apr-00	0.91	4.8	3,450

NA = Not Available

**SANTIAGO CREEK at VILLA PARK
STATION 214**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1964	10	05-Dec-63	0.00	0.2	115
1965	2	22-May-65	0.00	0.1	94
1966	3	17-Apr-66	0.00	0.5	33
1967	43	23-Dec-66	0.00	1.4	1,021
1968	41	16-Apr-68	0.00	2.7	1,938
1969	5,791	25-Feb-69	0.00	85.9	62,181
1970	25	01-Oct-69	0.00	2.7	1,929
1971	30	22-Sep-70	0.00	0.6	418
1972	21	22-May-72	0.00	0.4	218
1973	3	28-Jun-73	0.00	0.5	374
1974	6	11-Jan-74	0.00	1.9	1,289
1975	2	12-Mar-75	0.00	0.4	205
1976	2	01-Mar-76	0.00	0.1	65
1977	2	10-May-77	0.00	0.1	58
1978	1,624	02-Mar-78	0.00	53.4	38,670
1979	60	02-Feb-79	0.99	4.0	2,878
1980	2,013	18-Feb-80	0.00	55.5	40,292
1981	4	03-Jun-81	0.00	0.7	502
1982	10	02-Apr-82	0.00	0.7	399
1983	1,201	03-Mar-83	0.00	30.4	22,132
1984	10	23-Oct-83	0.00	2.1	1,540
1985	4	19-Apr-85	0.00	1.2	912
1986	50	12-Jun-86	0.00	1.2	438
1987	2	04-Jan-87	0.00	0.0	5
1988	62	20-Jan-88	0.00	5.9	2212 *
1989	62	25-Dec-88	0.00	1.2	4024 **
1990	5	17-Feb-90	0.00	0.2	117
1991	95	05-Apr-91	0.00	0.7	484
1992	100	19-Jun-93	0.00	1.4	1,010
1993	3,000	27-Jan-93	0.00	76.0	55,010
1994	126	23-Jul-93	0.00	0.4	299
1995	3,000	06-May-95	0.00	33.3	24,110
1996	5	04-Mar-96	0.00	0.8	597
1997	24	14-Mar-97	0.00	1.0	741
1998	3,000	24-Feb-98	0.00	33.3	24,080
1999	26	03-Nov-98	0.00	29.5	5,869
2000	10	04-Aug-00	0.00	0.2	166

* 2060 ac-ft (93%) of runoff was imported water from Irvine Lake by OCW

** 1730 ac-ft (43%) of runoff was imported water from Irvine Lake by OCW

EL MODENA-IRVINE CHANNEL at MICHELLE
STATION 216

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1968	882	21-Nov-67	0.11	1.6	1,167
1969	1,291	23-Feb-69	0.11	4.9	3,550
1970	681	07-Nov-69	0.11	2.1	1,500
1971	790	19-Dec-70	0.11	2.0	1,459
1972	377	24-Dec-71	0.11	2.0	1,467
1973	818	14-Nov-72	0.11	3.4	2,432
1974	557	07-Jan-74	0.21	3.3	2,343
1975	998	04-Dec-74	0.21	2.5	1,783
1976	356	02-Mar-76	0.21	1.9	1,338
1977	1,069	12-Nov-76	0.21	2.3	1,629
1978	2,427	04-Mar-78	0.10	7.5	5,383
1979	2,325	27-Mar-79	0.21	5.2	3,778
1980	2,956	16-Feb-80	0.32	8.5	6,113
1981	2,289	29-Jan-81	0.49	2.8	1,986
1982	1,647	14-Mar-82	0.71	3.6	2,619
1983	5,009	01-Mar-83	0.81	9.9	7,191
1984	1,598	01-Oct-83	0.99	3.1	2,247
1985	1,647	24-Nov-84	0.71	4.7	3,381
1986	2,293	14-Feb-86	0.60	6.5	4,540
1987	2,628	04-Jan-87	0.39	3.1	2,237
1988	1,402	04-Dec-87	0.32	2.3	1,665
1989	1,820	24-Dec-88	0.37	2.7	1,971
1990	888	17-Feb-90	0.24	3.7	2,620
1991	2,820	26-Mar-91	0.08	5.1	3,575
1992	2,990	12-Feb-92	0.04	5.1	3,650
1993	2,531	16-Jan-93	0.06	10.1	6,040
1994	NR	NR	NR	NR	NR
1995	3,390	04-Jan-95	0.26	10.7	6,430
1996	2,310	20-Feb-96	0.43	4.8	3,480
1997	2,270	15-Jan-97	0.48	5.0	3,630
1998 *	7,820	06-Dec-97	0.52	21.3	8,950
1999	1,140	07-Nov-98	0.84	2.6	1,910

NR = No Record due to channel construction activities

* Station off line July-Nov. 1997 due to D/S Channel Construction

EAST GARDEN GROVE-WINTERSBURG
STATION 217

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1969	1,024	25-Jan-69	0.35	7.9	5,721
1970	1,095	02-Mar-70	0.46	4.3	3,079
1971	1,458	19-Dec-70	0.35	4.9	3,566
1972	1,186	24-Dec-71	0.21	3.2	2,318
1973	953	16-Jan-73	0.11	6.4	4,579
1974	1,211	04-Jan-74	0.21	6.1	4,408
1975	2,599	04-Dec-74	0.35	5.6	4,100
1976	636	12-Apr-76	0.00	3.5	2,496
1977	869	11-Nov-76	0.21	4.8	3,444
1978	1,409	04-Mar-78	0.00	13.5	9,806
1979	1,024	27-Mar-79	0.18	10.7	7,755
1980	3,990	14-Feb-80	0.49	15.8	11,426
1981	3,520	01-Mar-81	0.71	7.2	5,227
1982	3,199	14-Mar-82	0.88	8.8	6,378
1983	3,397	01-Mar-83	0.71	15.2	10,940
1984	2,140	01-Oct-83	0.71	6.8	4,942
1985	1,610	18-Dec-84	0.00	6.4	4,603
1986	3,242	14-Feb-86	0.49	10.8	7,661
1987	1,644	04-Jan-87	0.86	4.9	3,556
1988	1,001	17-Jan-88	0.74	5.3	3,825
1989	1,884	24-Dec-89	0.54	4.6	3,351
1990	810	17-Feb-90	0.24	5.6	4,717
1991	1,280	27-Feb-91	0.72	6.3	4,501
1992	3,250	12-Feb-92	0.29	9.0	6,500
1993	3,420	07-Dec-92	0.86	15.7	11,350
1994	2,330	17-Feb-94	1.70	8.4	6,050
1995	4,000	04-Jan-95	1.70	20.4	14,750
1996	1,500	20-Feb-96	6.40	13.5	9,770
1997	1,500	21-Nov-96	2.60	13.2	9,550
1998	3,410	06-Dec-97	4.00	28.6	20,740
1999	1,430	08-Nov-98	5.60	15.0	10,850

OSU CREEK at CROWN VALLEY PARKWAY
STATION 218

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1971	579	29-Nov-70	0.00	1.3	940
1972	491	27-Dec-71	0.00	1.8	1,313
1973	1,624	11-Feb-73	0.00	3.0	2,147
1974	777	04-Jan-74	0.00	2.5	1,807
1975	791	04-Dec-74	0.35	2.0	1,467
1976	260	10-Jun-76	0.71	2.8	2,026
1977	569	10-Sep-76	0.92	3.3	2,374
1978	2,359	16-Jan-78	1.20	10.8	7,812
1979	2,444	05-Jan-79	1.31	9.7	7,010
1980	4,979	16-Jan-80	0.81	19.2	13,857
1981	978	01-Mar-81	0.95	5.0	3,622
1982	2,422	17-Mar-82	0.60	6.4	4,643
1983	4,908	17-Feb-83	0.42	13.0	9,319
1984	3,637	01-Oct-83	0.39	6.0	4,345
1985	1,068	27-Dec-84	0.21	6.0	4,311
1986	2,564	16-Mar-86	0.00	7.5	5,316
1987	996	17-Nov-86	0.21	3.2	2,382
1988	1,246	17-Jan-88	1.09	5.9	4,299
1989	1,750	25-Dec-88	0.54	4.8	3,446
1990	1,960	17-Feb-90	0.90	6.5	4,573
1991	4,940	27-Mar-91	1.10	11.1	7,757
1992	4,990	12-Feb-92	1.10	11.8	8,600
1993	3,000	16-Jan-93	1.10	17.7	12,530
1994	2,180	20-Feb-94	1.10	6.6	4,750
1995	7,320	4-Jan-95	1.20	24.6	17,830
1996	1,750	20-Feb-96	1.50	7.6	5,510
1997	2,360	21-Nov-96	2.00	10.6	7,660
1998	8,000	23-Feb-98	1.40	29.8	21,560
1999	1,690	28-Nov-98	0.00	5.57	4,030

LAGUNA CANYON CHANNEL at WOODLAND
STATION 222

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1973	89	14-Nov-72	0.11	0.4	241
1974	28	08-Mar-74	0.21	0.4	298
1975	61	08-Mar-75	0.00	0.2	170
1976	59	06-Mar-76	0.00	0.2	170
1977	180	01-Oct-76	0.00	0.4	107
1978	671	10-Feb-78	0.00	1.5	1,083
1979	498	15-Jan-79	0.00	0.8	588
1980	438	16-Feb-80	0.28	3.0	2,149
1981	59	01-Mar-81	0.35	0.7	542
1982	58	17-Mar-82	0.21	0.7	472
1983	1,398	01-Mar-83	0.18	3.1	2,269
1984	205	01-Oct-83	0.21	1.6	1,161
1985	60	09-Feb-85	0.49	NR	NR
1986	237	15-Feb-86	0.18	1.0	716
1987	161	04-Jan-87	0.18	0.2	165
1988	142	17-Jan-88	0.00	0.2	185
1989	178	24-Dec-88	0.03	0.3	243
1990	208	17-Feb-89	0.05	0.7	452
1991	NR	NR	0.05	0.4	251
1992	602	12-Feb-92	0.06	2.7	1,990
1993	342	18-Jan-93	0.08	7.7	5,600
1994	221	20-Feb-94	0.07	1.4	1,020
1995	2,260	10-Jan-95	0.07	6.5	4,730
1996	131	20-Feb-96	0.26	3.4	2,500
1997	246	26-Jan-97	0.17	5.1	3,660
1998	3,600	06-Dec-97	0.13	13.2	9,500
1999	158	25-Mar-98	0.16	1.04	755

NR = No Record

SANTA ANA-DELHI at IRVINE AVE.
STATION 220

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1971	1,300	19-Dec-70	0.35	NA	NA
1972	819	24-Dec-71	0.11	3.2	2,238
1973	1,098	16-Jan-73	0.11	7.1	5,172
1974	1,250	14-Oct-73	0.35	7.9	5,699
1975	2,567	04-Dec-74	0.46	6.5	4,726
1976	798	12-Apr-76	0.35	3.6	2,602
1977	989	12-Nov-76	0.21	8.3	6,040
1978	1,766	01-Mar-78	0.11	12.9	9,404
1979	1,561	27-Mar-79	0.88	12.6	9,080
1980	2,009	30-Jan-80	1.09	13.7	8,269
1981	2,299	29-Jan-81	0.67	7.1	5,180
1982	1,780	28-Nov-81	0.78	8.8	6,356
1983	4,344	01-Mar-83	0.74	16.5	13,215
1984	1,709	01-Mar-84	1.66	7.2	5,578
1985	1,172	09-Feb-85	1.31	8.3	5,983
1986	2,479	14-Feb-86	0.92	12.1	8,675
1987	NR	NR	NR	NR	NR
1992	4,830	12-Feb-92	0.54	11.4	8,300
1993	3,830	16-Jan-93	0.75	15.6	11,310
1994	2,580	17-Feb-94	0.60	7.4	5,370
1995	4,650	04-Jan-95	0.80	15.4	11,120
1996	1,390	02-Feb-96	0.85	6.4	4,640
1997	1,750	15-Jan-97	0.88	8.7	6,290
1998	6,450	06-Dec-97	0.88	22.9	16,560
1999	1,330	08-Nov-98	0.42	4.0	2,890

No Data -1987 thru 1991- Channel Construction Gage moved
U/S of Irvine Ave. 1992.

BOLSA CHICA CHANNEL at WESTMINSTER
STATION 225

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1986	5,740	14-Feb-86	0.56	7.8	4,481
1987	1,500	04-Jan-87	0.72	2.4	914
1988	329	17-Jan-88	0.64	2.4	1,709
1989	940	24-Dec-89	0.47	2.4	1,718
1990	388	17-Feb-90	0.07	1.6	1,128
1991	4,040	27-Feb-91	0.12	11.6	8,208
1992	4,150	12-Feb-92	0.19	3.4	2,500
1993	2,270	07-Dec-92	0.17	7.9	5,730
1994	3,120	24-Mar-94	0.46	5.0	3,600
1995	2,110	4-Jan-95	0.26	8.5	6,120
1996	535	20-Feb-96	0.44	2.8	2,030
1997	660	13-Jan-97	0.61	4.9	3,550
1998	2,030	06-Dec-97	0.59	16.9	12,250
1999	1,460	08-Nov-98	0.22	2.95	2,140

**SAN DIEGO CREEK at CAMPUS
STATION 226**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1978	9,650	10-Feb-78	10.10	83.0	60,184
1979	6,431	27-Mar-79	20.00	54.4	39,522
1980	11,307	16-Feb-80	17.92	77.7	55,670
1981	3,887	27-Jan-81	9.61	39.2	28,452
1982	3,373	01-Apr-82	12.40	41.9	29,943
1983	15,500	01-Mar-83	14.00	88.0	63,740
1984	NA	NA	18.00	37.8	27,460
1985	3,000	27-Dec-84	12.00	41.3	29,930
1986	3,500	14-Feb-86	12.00	47.0	33,791
1987	4,276	04-Jan-87	12.00	26.0	18,970
1988	4,417	17-Jan-88	9.00	30.0	22,051
1989	4,216	21-Dec-88	7.00	28.0	19,983
1990	3,686	17-Feb-90	8.77	27.6	17,818
1991	13,730	27-Mar-91	9.30	40.5	28,935
1992	16,400	12-Feb-92	6.50	51.2	37,180
1993	15,000	16-Jan-93	6.00	86.3	62,510
1994	5,460	17-Feb-94	8.80	30.4	22,000
1995	25,700	4-Jan-95	7.20	84.8	61,370
1996	4,410	20-Feb-96	9.10	32.4	23,500
1997	4,980	21-Nov-96	6.50	43.1	31,230
1998	43,500	06-Dec-97	4.70	125.0	90,270
1999	3,210	08-Nov-98	3.50	23.9	17,330

**SAN DIEGO CREEK at CULVER
STATION 231**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1986	2,931	15-Feb-86	0.99	10.3	7,272
1987	1,201	04-Jan-87	0.92	4.0	2,894
1988	1,236	17-Jan-88	0.49	5.2	3,883
1989	1,244	24-Dec-88	0.40	5.1	3,688
1992	7,190	12-Feb-92	0.13	16.1	11,680
1993	5,370	08-Feb-93	0.15	30.6	22,140
1994	1,530	17-Feb-94	0.14	5.8	4,190
1995	NR		NR	NR	
1996	1,400	21-Jan-96	0.99	10.1	7,320
1997	1,910	15-Jan-97	0.52	14.1	10,240
1998	15,300	06-Dec-97	0.58	44.7	32,380
1999	724	25-Mar-99	0.21	7.6	5,500

No Data - 1989 thru 1991 - Channel Under Construction.

**PETERS CANYON WASH at BARRANCA
STATION 230**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1986	2,899	14-Feb-86	7.92	22.0	15,809
1987	1,462	04-Jan-87	6.78	15.4	11,107
1988	1,589	17-Jan-88	6.78	16.1	11,674
1989	1,858	24-Dec-88	6.10	14.5	10,489
1992	5,640	20-Mar-92	3.90	20.2	14,700
1993	7,090	16-Jan-93	3.80	40.3	29,170
1994	3,270	17-Feb-94	4.60	13.7	9,910
1995	6,000	10-Jan-95	4.80	29.8	21,560
1996	1,290	21-Jan-96	3.00	11.6	8,450
1997	3,590	15-Jan-97	4.50	18.5	13,400
1998	8,990	06-Dec-97	3.10	47.4	34,310
1999	1,770	26-Jan-99	4.60	12.0	8,700

No Data - 1989 thru 1992 - Channel Under Construction.

**ANAHEIM-BARBER CITY at RANCHO
STATION 232**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1987	1,530	04-Jan-87	0.46	4.3	3,156
1988	1,289	04-Dec-87	0.18	4.4	3,193
1989	1,606	24-Dec-88	0.18	5.9	3,327
1990	1,700	17-Feb-90	0.05	4.8	3,015
1991	1,763	27-Feb-91	0.18	4.8	3,224
1992	6,083	12-Feb-92	0.14	8.1	5,870
1993	3,890	07-Dec-92	0.45	12.7	9,220
1994	4,600	24-Mar-94	0.72	7.8	5,650
1995	11,500	4-Jan-95	0.51	11.1	8,050
1996	1,890	20-Feb-96	1.40	7.7	5,580
1997	1,860	13-Jan-97	0.42	9.2	6,670
1998	2,480	06-Dec-97	0.72	12.8	9,279
1999	1,340	07-Nov-98	238	10.1	7,300

**OCEANVIEW CHANNEL at Footbridge
STATION 287**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1997	63	21-Nov-96	0.01	0.4	279
1998	NR				
1999	NR				

No record for Water Years 1997-99 - Channel improvements

**UPPER EAST GARDEN GROVE-WINTERSBURG
STATION 1187**

SEASON ENDING	MOMENTARY PEAK CFS	DATE	MIN. DAY IN CFS	MEAN DAILY IN CFS	TOTAL AC-FT
1996	144	20-Feb-96	0.00	0.3	241
1997	129	13-Jan-97	0.00	0.2	130
1998	146	07-Feb-98	0.00	0.8	596
1999	117	08-Nov-98	0.00	0.3	209

APPENDIX B
ENGLISH TO METRIC CONVERSIONS

CONVERSION FACTORS

AREA

1 acre (ac) = 43,500 square feet (ft)²
= 0.4046 hectare (ha)

1 square mile (sq. mi.) = 2.59 square kilometers (km)²
= 640 acres (ac)

ELEVATION

1 foot (ft) = 0.3048 meters (m)

1 mile (mi) = 1.609 (km)
= 5,280 feet (ft)

PRECIPITATION

1 inch (in) = 25.4 millimeters (mm)

RUNOFF

1 cubic foot per second (cfs) = 28.3 liters per second (L/S)
= 450 gallons per minute (gpm)

TEMPERATURE

degrees fahrenheit (f) = degrees celcius (c) = 5/9 (F-32)

VOLUME

1 acre foot (ac-ft) = 1,23335 cubic decameters (DAM³)
= 325,900 gallons
= 1233.5 cubic meters (M³)